

**THE CORRELATE BETWEEN FERTILITY AND LANDHOLDING AMONG
RURAL WOMEN IN KENYA: A MULTIVARIATE ANALYSIS**

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POPULATION STUDIES.**



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MAY, 2013

DECLARATION

I declare that “Linkages between fertility and landholding among rural women in Kenya” is my own work. It has not been submitted for any degree or examination in any other university and all the resources used or quoted have been indicated and acknowledged using full references.

Name : Violet Wambui Chege

Date: 28 May 2013

Signature :



DEDICATION

I affectionately dedicate this piece of work to everyone who supported me during this journey and all those that constantly wished me success.



ACKNOWLEDGEMENT

First, I thank God for blessing me with the gifts of life, the intellect, wisdom and courage throughout this journey. Second, I thank my mother whose continued sacrifice, prayers and support made it possible for me to pursue and complete a graduate degree. My sisters, Stella and Sylvia I thank you for your continued support during this time and for being my role models. To all those who assisted me in making this work a success, I am eternally grateful for the laughter, advice and support we shared even when the journey seemed endless! Lastly, I thank my academic supervisor, Dr. Appunni Sathiya Susuman for the continued advice and ability to guide me throughout this process. I am especially grateful to you for teaching me about the research processes and your ability to keep me on track in every step of the way.

May the Almighty God bless you.



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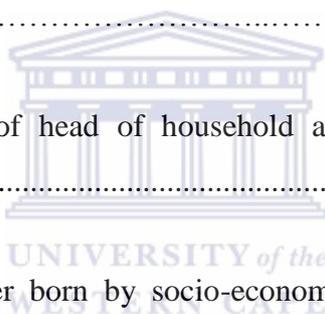


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ABSTRACT

The present study is an understanding of the relationship that exists between landholding and the reproductive behaviour of rural women in Kenya. Traditional women have rights to cultivate land as well as control income from the resulting crop production but rarely have rights to allocate or alienate land. Men are the rightful owners of the land. When the rightful owner person passes away, the eldest son of the family automatically takes ownership of the land and subsequent care of the family. This period of land ownership supported high fertility rates. However, in current spaces this practice has changed. Land is scarce and people are opting for other alternatives of limiting their family sizes.

The aim of the study is to address the dissimilar changes of fertility behaviour among women in rural Kenya. Particularly, landholdings and low fertility behaviour, focusing on how this change happened. Data used is from the Kenya Demographic and Health Survey (KDHS) 2008/2009. We acquire a representative sample size of 6761 women age 15-49 from the data. A multiplicity of statistical parameters like *chi-square* test, *p-value*, logistic regression, and multivariate analysis are adopted.

In this regard, the relationship that exists between fertility and landholdings leads to large family sizes. In addition, land decrease has lead to the search of alternatives such as education, employment, and increase in age at marriage. The introduction of these factors has promoted smaller family sizes.

This study is immensely useful for the policy makers, planners and other interested stakeholders in population and development spheres in this juncture.

KEYWORDS

Fertility, fertility behaviour, landownership, rural women, sex preference, desired family size, farm size, fertility levels, and trends.



LIST OF ACRONYMS

CEB	Children Ever Born
CEDAW	Convention on the Elimination of All Forms of Discrimination against women
FAO	Food and Agriculture organization
GDP	Gross Domestic Product
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
IDHS	Indonesia Demographic Health Survey
IUD	Intrauterine Device
KDHS	Kenya Demographic Health Survey
MDG	Millennium Development Goal
OLS	Ordinary Least Squares
SPSS	Statistical Package for Social Scientists
TFR	Total Fertility Rate
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/ Acquired Immune Deficiency Syndrome
UNIFEM	United Nations Development Fund for Women
VOA	Voice of America

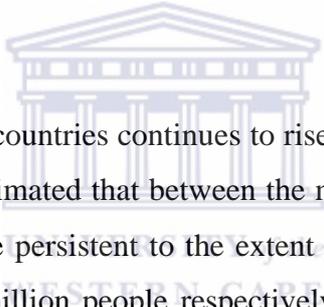
CHAPTER ONE

INTRODUCTION

1.0 Introduction

The trends of global population changes and projections as influenced by fertility are highlighted in this chapter. The concerns raised by global development stakeholders such as the World Bank United Nations regarding the current trends of population growth have been outlined. A Kenyan case for the purpose of this study has been highlighted with emphasis on the patterns of population growth in relation to fertility. The role of landholding in rural women's reaction towards fertility in Kenya is described. Furthermore, the statement of the problem, the study aim, objectives and the significance of the study are outlined.

1.1 Fertility



Population growth in developing countries continues to rise at an alarming rate. According to (United Nations (2011)) , it is estimated that between the next decade and 2100, the growth rate in sub- Sahara Africa will be persistent to the extent that in the next decade, will have tripled from 1.2 million to 4.2 million people respectively. In other developing countries, China and India will constitute about 37% of the world's population; Africa is the second-most-populated continent, with around 1 billion people, or 15% of the world's population. Europe's 733 million people make up 11% of the world's population, while the Latin American and Caribbean regions is home to around 600 million (9%). Northern America, primarily consisting of the United States and Canada, has a population of around 352 million (5%), and Oceania, the least-populated region, has about 35 million inhabitants (0.5%) (United Nations 2011). Slow secular mortality decline has added to population numbers and broadly cancelled out any overall decline in fertility (Thomas 1991). Decline in fertility has mostly been experienced in countries like China with the implementation of the one child policy unlike Africa.

According to the Population Division of the United Nations's Department of Economic and Social Affairs DESA 1998, the world population was at 6 billion people. In 2011, an

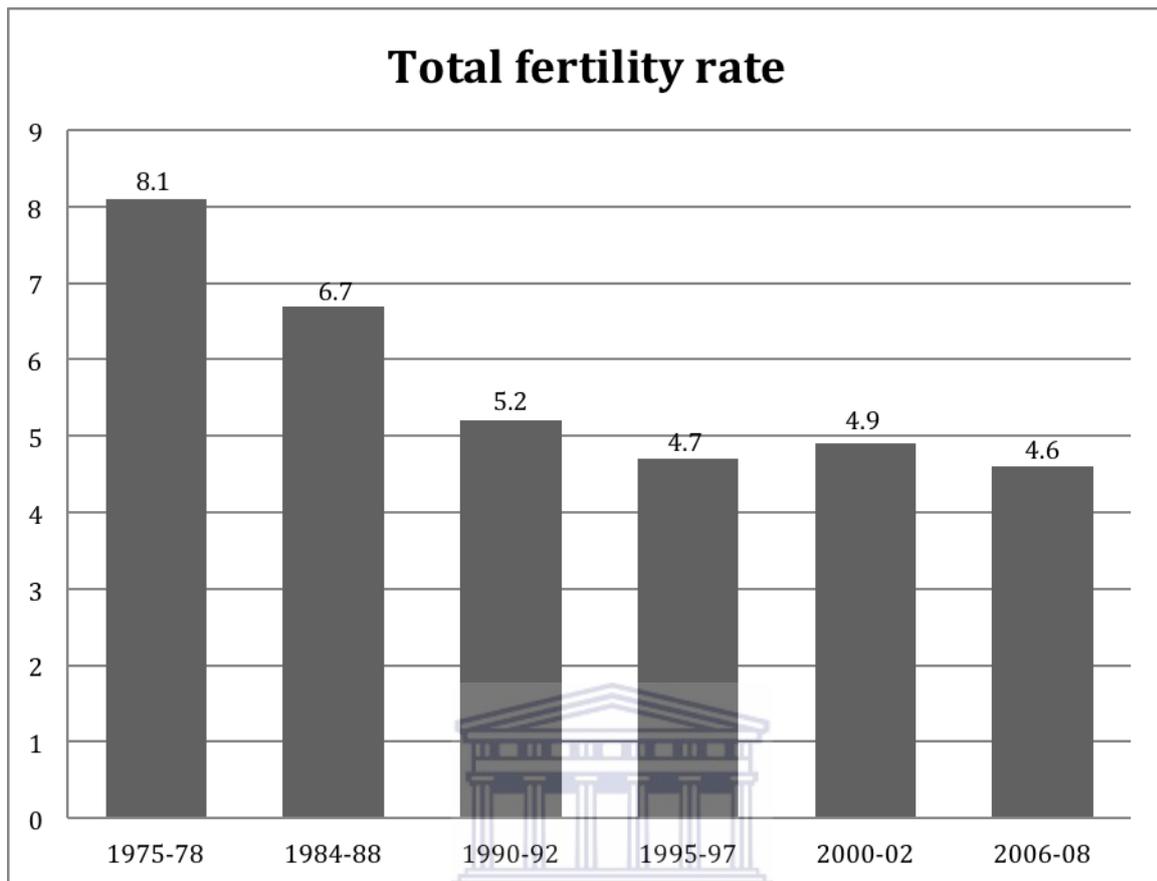
increasingly rise emerged and was expected to hit the seven billion mark. It was further estimated that the population would keep expanding till it reached 9.3 billion as it heads toward 10 billion by the year 2050, with calculations from current trends (Zlotnik 2011). This population growth is attributed to fewer deaths as well as more births. Much of this increase was projected to come from 58 high-fertility countries. That is thirty nine in Africa, nine in Asia, six in Oceania and four in Latin America. The projections were part of the *2010 Revision of World Population Prospects* released by DESA. (United Nations report 2012). Developing countries were thus viewed as being rampant in their growth. In relation to the case study, Kenya's fertility has been significantly high. According to the United Nations Population estimate, Kenya's population was estimated at 42.7 million people as per with an (UN, 2012 estimate) at an average growth rate of 2.7% per year; tripling from 10.9 million people in 1969 (United Nations, 2012).

Until recently; having a large family of more than 8 children was in support of agricultural production labour markets. This situation of unlimited child birth; lead to rapid population growth that quickly superseded the available resources. This trend was supported Malthusian's Growth Model which states that "*population growth increases geometrically as the resources increase arithmetical*" (Malthus & Appleman 1976). With the realization of continuous growth and situations of great famine, this situation raised major concerns among the governments, World Bank, population planning agencies, resource sectors and many more agencies. Not all were in agreement that this was a problem. In a media statement by Babatunde Osotimehin, Executive director of the UN Population Fund (UNFPA), argued that "A world of 7 billion is both a challenge and an opportunity that would require global collaboration to address its impact. ". He further explained that the population projections underscore the urgent need to provide safe and effective family planning to the 215 million women who lack it (UNFPA 2012). This was supported by the fact that globally, people are living longer, healthier lives and choosing to have smaller families. But reducing inequities and finding ways to ensure the well-being of people alive today as well as the generations that follow would require new ways of thinking and unprecedented global cooperation. Further he added that "Small variations in fertility when multiplied across countries and over time make a world of difference", (IPS newspaper 2012).

Population growth is usually a positive indicator if managed well but an annual growth rate of more than two per cent poses immediate threat to government's efforts to reduce poverty. Kenya's challenge in providing physical and social infrastructure became clear with the release of the 2009 census results showing that the country's population was growing at a pace out of tune with its development goals. Consequently, Kenya was facing the grim reality of feeding an additional one million mouths every year translating to a population growth rate of 2.8 per cent, more than the global average of 2.1 per cent (Omondi 2010) and requiring the economy to grow at the rate of more than 12 per cent to remain in step with its development targets.

Before the 1970's, Kenya experienced its highest fertility rate of 8 children per woman Kenya National Bureau of Statistics (2010), This implied that a woman could have given birth to 8 children during her reproductive period. During 1970-1975, total fertility declined by 37 per cent. That is from 4.5 births in rural areas to 2.8 in urban areas per woman between 1995-2000 (United Nations secretariat n.d). The trend of Kenya's fertility rate declined during the 1980s and 1990s, changing from a high of 8.1 children per woman in the late 1970s to 6.7 in the late 1980s, and dropping to 4.7 during the last half of the 1990s. However, it rose after 1998, reaching a TFR of 4.9 children per woman during the 2000-02 period. Then it declined, reaching a TFR of 4.6 children per woman during the 2006-08 periods Kenya National Bureau of Statistics (2010), as shown in Figure 1.1.

Figure 1.1 showing the Total fertility rate of Kenya since 1975-2008



Though rates have declined, population growth is still on the rise and this formed a major concern since most of Kenya's population was in the younger age group of 15-35 and was at the prime of their reproductive life span. Population growth experienced in Kenya was attributable to high fertility and low declining mortality. Other studies also showed new findings emerging from the Demographic and Health Surveys (DHS) program, highlighting that the situation had changed (Kenya National Bureau of Statistics, 2010). Declining fertility thus emerged and these were partly explained by the increase in women's educational attainment, occupational status, empowerment of women and status in society which gives women a voice and make them decision makers of their reproductive life

Family planning programs are another key indicator for fertility changes. In 2002, , *the newspaper* called Voice of America (VOA) in the United States reported ,that the Kenyan Red Cross saw positive changes in attitudes towards sexual health (Onyiego 2011). Nearly 90,000 condoms were delivered for both male and female to people of Mashambani, a village in the

Isiolo region in the Eastern Province of Kenya, where the shortage of condoms was creating what observers deemed a health emergency. According to the United Nations this was due to condom shortage in the country attributed to the lengthy procurement procedures for failure to meet delivery deadlines. This was further corroborated by one of the leading national newspapers cited that that the country was facing a condom shortage following increased demand, which had hit 20 million monthly (Onyiego 2011). In addition, Kenya's Public Health Director, Shahnaaz Sharif, (2012) explained that previously the monthly need of the condoms had been about 8 million, but that year it had climbed up to 20 million.

The onset of childbearing has a direct bearing on fertility. Early initiation into childbearing lengthens the reproductive period and subsequently increases fertility (Opiyo, 2004). Overall, the median birth interval in Kenya has remained constant since 1998, changing marginally from 32.9 months in the 1998 KDHS to 32.6 months in 2003 (Kenya National Bureau of Statistics, 2010). However, the median birth interval is relatively shorter for children born to younger women; to women in the rural areas; to women with less than secondary education; and to women from poorer households (Kenya National Bureau of Statistics, 2010). The shortest birth interval was observed among children born to women age 15-19 (23.7 months) and children whose preceding sibling died at 24.6 months), while the longest was among children born to women with at least some secondary education (36.2 months) and women age 40-49 (42.1 months) (Kenya National Bureau of Statistics, 2010). Overall, 23 percent of Kenyan children are born less than 24 months after a previous birth, an interval perceived to be "too short." This is identical to the level in 1998. A larger proportion of such children were born to younger women age 15-19 (52 percent) relative to other age groups, to women in North Eastern Province (38 percent) comparatively. Generally, age at first birth has shown some slight increase over the years, being later for younger women as compared with older women (Kenya National Bureau of Statistics, 2010).

1.2 Land holding

Land is the major form of asset in developing countries. It is mainly used by most developing countries for subsistence production and small scale economic activities. Stable and secure access to land is a basis for the livelihood of people, an opportunity for economic growth and

act as a vehicle for investment (Mwangi & Nyika 2010). Land is as well considered by the Food and Agriculture Organisation (FAO) as one of the natural resources whose acquisition is essential for sustainable poverty reduction (Ellis & Allison 2004). Lack of access to land by rural people increases their vulnerability since it makes it difficult for them to acquire food, accumulate assets and recover after natural or market shocks or misfortunes (Ellis & Allison 2004). Many land use practices are absolutely essential because they either directly provide critical natural resources and ecosystem services or through land use practices natural resources are converted into useful products (Soini 2006).

How we use land is the most important aspect of societal development and civilization. Land use involves the efficiency and sophistication of developing and managing the environment for sustainable human activities. In Africa, a great majority of the population lives in rural areas and is fully dependent on land and other natural resources for their livelihood (United Nations Development Fund for Women, n d). These activities are the foundation of each country's economy. Out of the total land area in Africa, only a fraction is used for arable land. This total land area in Africa has three different types of land use. That is, arable land cultivated for crops like wheat, maize, and rice that are replanted after each harvest; permanent crops like citrus, coffee, and rubber that are not replanted after each harvest. It also includes land under flowering shrubs, fruit trees, nut trees, and vines, but excludes land under trees grown for wood or timber; other - any land not arable or under permanent crops; includes permanent meadows and pastures, forests and woodlands, built-on areas, roads, barren land, etc (The world fact book n d). African countries use of land forms the basis of their economic foundation. Some of the countries are Kenya, Malawi, Tanzania, Chad, Republic of Congo, Rwanda, and South Africa.

Land in Kenya is very vital for the survival of the economy. Nevertheless, less than 8% of the land is used for crop and feed production. Less than 20% of the land is suitable for cultivation, of which only 12% is classified as high potential adequate rainfall for agricultural land and about 8% is medium potential land. The rest of the land is arid or semiarid (The world fact book n d). Agriculture is the backbone of Kenya's economy and remains the most important economic activity, due to its significance in contributing to economic growth. About 80% of Kenya's work force engages in agriculture or food processing. A great proportion of more than half are women, of whom 80% do the vast majority of agricultural

work and produce/market the majority of food (United Nations Development Fund for Women, n.d). However, they earn only a fraction of the income generated and own a nominal percentage of assets, since majority of them are not land owners but rather owners of crops. The implication at this juncture is they generally have rights to cultivate land as well as rights to control income from the resulting crop production but have little or no rights to allocate or alienate land. Men are the rightful owners of the land and rarely take up cultivation; yet they are the sole beneficiaries of the proceeds of the activity.

Women's reduced access to land under state resettlement and irrigation projects further illustrates how tenuous women's rights are under certain systems. Women usually lose land under formal projects, even in cases that specifically target women. (Bloch, 1993) examines women's access to land on small-scale irrigation plots along the Senegal and Faleme rivers in eastern Senegal. In traditional agriculture women had their own fields from which they controlled the income. In Zimbabwe, Jacobs, (1991) observes how land reform and resettlement was biased against women, while Cheater, (1990) notes that the chiefs and district councils refused to allow women's cooperatives to obtain land. In the Gambia, farmers recognized both common and individual land rights. Women had historically controlled rice fields that they cleared with their own labour. Their rights to this land were well defined: they controlled the production from this land, but more significantly they controlled the right to transfer land, which they generally did, to their daughters. Women's access to land changed when the irrigation projects intervened (Gray & Kevane 1999).

Women have been deprived of what is rightfully theirs. Men easily manipulated women and benefited from what they had toiled for, since there were no laws that protected them. For a long time women were and are still referred to as the "weaker sex". In Kenya women had no say in land matters but in December 1986, Wambui Otieno a Kenyan Mau Mau fighter and one of the first women to run for political office campaigned extensively on behalf of women and the co-operative movement. *The case of Wambui Otieno v Umira Kager Clan* drew controversy surrounding her husband's burial and Wambui's brave fight to secure her land rights as a widow against her husband's family; made her notorious in some quarters but also a hero to many Kenyans (Adenekan, 2011). The case, dubbed the "*trial of the century*" by the Kenyan press, brought attention to the rights of women, especially widows, under Kenya's constitution (Adenekan 2011). Kenyan women are now aware of their land rights

and confidently stand up for them. In addition, land grabbing can now be trailed and outcome decided in court.

Nevertheless, women are still powerless in regard to land ownership. It is argued that the narrative of erosion of women's land rights comprises three distinct processes. First, changes in the value of land sometimes seem to be leading to changes in the incidence of exercise of rights. In particular, changes in the practice of marriage in Kenya and Rwanda have led to reductions in the incidence of women exercising rights to land from their husbands (Gray & Kevane 1999). Second, sometimes the tenure status of women is altered primarily through redefinitions of rights and social identity (Gray & Kevane 1999). Third, sometimes state interventions create new rights for men and adversely affect women's access to land (Gray & Kevane 1999). Initiatives of acquiring education even though pursued takes place at an inferior rate to their counterparts, increasing their reliance upon men. They are also limited from owning, acquiring, and controlling property throughout Kenya, regardless of social class, religion, or ethnic group. If women attempt to assert property rights over men or in-laws, they are often ostracized by their families and communities.

A woman's rights depend on her social position in both customary and statutory law (Gray & Kevane 1999). Customary law may enjoin a husband to provide his wife with land, a requirement absent from most statutes. Statutory law may grant a woman a share of the land of her husband upon his death. None of the laws apply to most tribes of Kenya. In communities that the death of the man occurs and there are no mature sons, widows are left vulnerable because land is generally registered in the man's name and they are not considered heirs. Land is taken over by in-laws, if there are no mature sons and the widow is forced to marry the brother of the deceased. It is not uncommon for the matrilineal relatives of the deceased to evict, without compensation, wives and children from farms on which they have lived and labored all their lives. Okali, (1983) notes that women prefer to work for themselves because there has been an increased tendency for "matrilineal heirs to eject their predecessors' widows and children from the enjoyment of properties that they helped build." In other instances, do widows continue to farm land that was registered in their husband's name just until the children are of age, allowing the male children to inherit land and continue to let their mothers farm it (Gray & Kevane 1999). Also, a woman with an underage son typically has no right to farm her deceased husband's property until the son is an adult and

could allocate the land as he wished. This period was known as the intermittent period, where land would often lie fallow at a time of great hardship for women and their children (Gray & Kevane 1999). Other communities do acknowledge the women's use rights are contingent on status, through their ties to kin and husbands. A senior wife may have stronger rights than a junior wife. A woman's rights may increase with the length of marriage or with more children (Guyer 1986). Rights may end with divorce, with widowhood, with failure to have sons. Sometimes rights improve with the duration of a marriage, or, for an unmarried woman, the length of time a particular plot has been cultivated (Guyer 1986).

Like people almost anywhere, rural Africans do not generally hold land simply as individuals. Women form organizations that enable them to purchase land collectively. Personal land claims always depend on broader social entities, or combinations of them: whether on extended household families, lineages, villages, chiefdoms, ethnic sections, or other groups or networks. As resources become scarcer, individuals shift and realign their allegiance to different levels or kinds of groupings, as Goheen (Shipton & Goheen 1992) shows in her discussion of two levels of chiefdom and the nation state in Cameroon, or as Peters cited in (Shipton & Goheen 1992) shows in her discussion of family, syndicate, ethnic group, and nation state in Botswana. Some play off one kind of social unit against another in seeking land opportunities or defending against encroachments. The position of women in sub-Saharan Africa vis-a-vis land is highly variable and contentious, but most women in Africa gain rights to land through their relationships with men, as wives or kin. With new technologies, rising land values, and government and donor interventions, the trend is clear throughout the continent: women's rights to use land, gained through husbands or kin, are exposed as secondary and diminishing (Gray & Kevane 1999). In response to these changing rights in and access to land, women have mounted both legal and customary challenges to inheritance laws, made use of anonymous land markets, organized formal cooperative groups to gain tenure rights, and manipulated customary rules using woman-to-woman marriages and mother-son partnerships.

Dei, (1994) makes clear that women's access to the land market is not necessarily free from conflict and suggests that it took organized action on the part of women to clear paths of access. Schroeder (1993) and Newbury (1984), discuss cases in which women's groups, often organized with church, donor agency, and nongovernmental agency assistance, marched and

protested to local state authorities. In the Gambian case discussed by Schroeder, (1993), they also represented themselves collectively to a donor agency, obtaining funding to permanently demarcate garden plots--over which they had only insecure customary tenure-with concrete and wire fencing.

The UN has instigated policies to secure rural women's rights, options and livelihoods with the creation of two pillars that deal with awareness raising, advocacy and reporting on rural women's condition. In addition, it focuses on their human, social, political and economic rights and the African Women feed Africa which encompass awareness raising, outreach and advocacy on rural women's issues and reporting on progress in securing their rights and livelihoods in the framework of Beijing follow up processes, commission on the Status of Women, Convention on the Elimination of All Forms of Discrimination against women (ceDaW), monitoring and other intergovernmental processes (United Nations Development Fund for Women, n d).

Overall, not even 2% of land is owned by women in Sub-Saharan Africa. A 2001 study of the economic commission for Africa (ACA) in Kenya notes that although women contribute 75% of labour, they own only 1% of the land and 5 % are registered landholders in Kenya. On average, men's land holdings were almost three times the women's land holdings (Deere & Doss, 2006). In many African countries, custom prohibits women from owning land. Land inheritance for women is still problematic, especially in rural communities. Frequently, women have only use rights, mediated by men, and those rights are highly precarious. Liberalization and commercialization of land for agricultural production or tourism development in most African countries also has a negative impact on women's land ownership. Indeed land transactions have changed some of the traditional mechanisms of ensuring access and use of land resources by all members of the community (Sokoni, 2007).

1.3 The role of landholding in influencing fertility among women

Women are the gender that wants to get independence and empowered, representing the majority of rural populations and of the agricultural workforce in Africa. The enrolment of women in schools has shoot up. According to World Bank estimates as quoted in United Nations Development Fund for Women, (n d), agricultural self-employment by sex in Sub-

Saharan Africa amounts to 54% for women and 57% for men Food and Agriculture organization (FAO) gender agriculture database mentions that in some African countries, women manage the majority of agricultural holdings with the highest percentages recorded in Lesotho (55%), Cape Verde (53%) and Malawi (52%). World Bank deplores that while women account for more than 50% of the labour force in the agricultural sector, and that they are responsible for three-quarters of food production in sub-Saharan Africa, the design of many development policies continues to assume wrongly that farmers and rural workers are men (World Bank in United Nations Development Fund for Women, n d). Most women are thus moving from this because of gender issues that are still insufficiently addressed in the development and financing of agricultural policies and plans. Although rural women's contribution in food security through subsistence farming in vast countries like Nigeria is higher (60-80 %) than that of men, their contribution in rural development and food security is hardly noticed. Furthermore, they hardly get opportunities to contribute in decision and policymaking regarding agricultural development (Ogunlela & Mukhtar, 2009). More than a decade ago Saito, Mekonnen and Spurling, (1994), reported that the performance of agriculture in sub-Saharan African had been unsatisfactory and its output lagged behind the population growth. Interestingly, this poor performance was attributed to failure of governments and donors to comprehend and respond to the growing role of women in African economies.

Most women farmers are still compounded in subsistence and small-scale farming rather than cash crop production. It is for these reasons they see their hard work is not bearing fruits thus formulate strategies to better their children lives, this can only be achieved by provision of education, directing them to look for other alternative jobs, pushing them to move to urban areas, in return the children should help them in old age (SOFA Team & Doss 2011). These strategies motivate the young generation, to consider certain factors such as low fertility rates, increase in age at marriage that results in increase of age at first birth. The manageability of education in Kenya for instance in recent years with the introduction of free primary and subsidized secondary education may contribute to a shift from high fertility for increase labour force to smaller families that can be educated. 2003 reflected a rise in median age at first birth of 20.1 years for women age 25-29, reflecting a marginal rise from the 19.6 years recorded for the same women in the 1998 KDHS (Kenya National Bureau of Statistics, 2010). This stage does not register transfer of skills.

1.4: The relationship between land holdings and Fertility

Land ownership and distribution, and human fertility, exist within complex institutional settings which must be incorporated into any interpretation of statistical results. In sub-Saharan Africa, 31 % of rural households are headed by women, compared to 17% in Latin America and the Caribbean and 14% in Asia (UN Statistical Division Database) in (United Nations Development Fund for Women n d).Men migrate in such of jobs while the women are left in charge of the households. Women provide about 70% of all the agricultural labour and produce about 90% of the food (SOFA Team & Doss 2011).Land cultivated by women is owned by men and the proceeds from the land goes to the owners not laborers, leading to male dependency by women. This prior factor leads to women having male children in order to secure their rights to the land.

Inheritance is the norm in attaining land but this has become more complex and costly than ever before. Land has been divided from generation to generation while situations of land grabbing occur while others experience battles from extended families that end up in courts. Sub-division of land for inheritance has left each person of these families with small pieces of land or none at all. The association between the amounts of land couples own or operate and the number of children they have is not news that has been discovered recently. It's a debate that has been contested over the years. Due to our negligence in dealing with the situation, population is still increasing tremendously and has lead to extreme poverty. This is the first major concerns to be addressed in the millennium development goals (MDGs).

The association between landholdings and fertility in rural women does not differ from what we have now and in accent times. We might state that the number of children may have decreased from 8 to 4.5 Kenya National Bureau of Statistics, (2010) but the same condition applies. The study of the association between land and fertility has been facilitated by the suggestion of Stokes and Schutjer (Cain 1985). These authors propose two hypotheses which relate these characteristics of landholdings to fertility. The first, which Cain has called the 'land-labour demand hypothesis' proposes a positive relationship, whereby the greater the size of land- holdings, the more valuable will be children's labour, thus increasing the demand for children, and, therefore, the level of fertility. The second hypothesis, the 'land- security

hypothesis' posits a negative relationship between land ownership and fertility, resulting from the substitution of land for children as a security (Cain, 1985).

Land holdings in Kenya are a source of livelihood, mostly in rural areas. *“It’s stated that women who have a lot of children have big portions of land holdings, to encompass the labour they may want when cultivating land. Culture encourages women to have many children as a sign of fertility ignoring the difficulty in providing for all of them”*. Families with large amounts of land prefer to employ members in the family enterprise. This ensures more profits, income, faithful workers with little attention on supervision and more productivity. While those without land are choosing to educate their children since they no longer have land to distribute amongst them. This is further encouraged by the possibility that this children will go through free primary education. Others circumstances lead boys to search for jobs, to fend for themselves while the girls are married off at an early age.

Different scenarios and other external factors may influence how to explain the land labour and land security hypothesis. According to Clay and Johnson (1992), high fertility in Africa stems from incomplete knowledge of different causes and consequences of the fundamental relationship between landholding and the reproductive decisions of African farm couples.

1.5: Problem Statement

The implication derived from the relationship tends to derive questions instead of answers. African communities are dependent on agriculture for their livelihood and these advocates for land to be easily available to households. But with the harsh environment and increase in the population land has become scarce. This has decreased the level of security within a household and has subjected women to reduced fertility patterns. Yet, the outcome of this is a situation where rural women in Kenya who do not own land giving birth more. In addition, illiteracy is prevalent in rural areas due to inaccessibility to schools and the cost that one incurs though this reflection has changed with the award of free primary education since 2007 and now also the inclusion of secondary education. Illiteracy is related with desire for big families.

Building on the factors that influence fertility, their improvements is meant to lead to decrease the reproductive patterns of women. Education been the standing out factor and directly linked to most of these factors is prominently advocated by most organizations. Kenya's population has had an outstanding increase in the number of people obtaining education. This is due to the fact that land is decreasing and parents are opting for education as a future security asset. Yet from these we still find educated parents having large family sizes and their explanation is their ability to provide for their families. This really sanctions the capability to reduce the population in Kenya. There is therefore a need to find out the circumstances unto which women from the rural sector upkeep the children they bear .Furthermore; we need to look at the provision capability and also their family sizes. This can only be done through assessing the objectives, research questions and hypothesis of this study as shown below.

1.6: Aim of the Study

To investigate if a relationship exists between landholdings and fertility among rural women in Kenya.



1.7: Objectives of the Study

1. To identify the fertility behaviour among rural women with landholdings in Kenya.
2. To determine the size of landholding among rural women fertility in Kenya.
3. To examine the influence of social-economic demographic and family planning characteristics on the fertility behaviour of rural women.

1.8: Research Questions

1. What is the relationship between land holdings and fertility among rural women in Kenya?
2. What levels of landholdings are among rural households in Kenya?
3. How does the size of land holdings affect fertility rates of rural women in Kenya?

1.9: Hypothesis

1. Illiterate rural women who own large amount of land tend to produce less number of children.
2. Literate rural women who do not have land holding are producing more number of births.
3. Majority of Kenyan rural women headed households are landless or have small landholding size.



CHAPTER TWO

LANDHOLDING AND FERTILITY BEHAVIOUR AMONGST RURAL WOMEN IN KENYA.

2.0 Introduction

Majority of the population of the developing world resides in rural areas, and will continue to do so in the next coming years due to the association of slow developmental growth. This been the case, this study assumes that a large portion of the total world population growth over the last two decades was from the rural sector. Until recently, fertility reduction has been rampant in some developing countries but growth among most of the population has been growing at an alarming rate. There are many reasons for this, but this study will be based around the land fertility relationship that has undergone severe scrutiny from several authors.

Developed and developing nations have both experienced high fertility rates that have over spilled into growing populations. In response to this developed countries have initialized programs that lead to reduction in their fertility patterns. It is stated that might state that the number of children from developed nations may have decreased from 8 to 4.5. These reductions are associated with family planning programs, further education, creation of more jobs that reduce the number of unemployed people, improvement in health care services and initiatives of free or affordable medical services and many more. While these initiatives may be available to developing worlds, their magnitude of introduction and accessibility differs from the developed nations. Another challenge that is faced by developing nations is the issue of poverty. Poverty is the upraising issue amongst developing nations that has hindered development and is the number one cause of high fertility across all borders of developing nations. In addition, it is the most challenging Millennium development goal (MDGs) and eradicating it is a priority for all nations that are face it.

In Africa, a great majority of the population residing in the rural areas are fully dependent on land and other natural resources for their livelihood (United Nations Development Fund for Women n d). This activity is the foundation of each country's economy and is a practice that is mostly associated with women. These women are not owners of land but rather owners of crops meaning they generally have rights to cultivate land as well as rights to control income

from the resulting crop but rather alienate or allocate land (Gray & Kevane 1999). African cultures in developing countries do not allow women to inherit land both from parents or their husbands and as an approach to ensure that they have security over the land in the case of the husband's demise or security at old age; they result to the birth of children with preference to a male child. This perception was what leads to an investigation to this effect.

Chapter two will be presented in two sections. The first section will present a theoretical framework (background) about the general thoughts of the association between landholdings and fertility patterns. Secondly, it will look at the effects of demographic, social economical and cultural factors to the land fertility relationship.

2.1 Theoretical framework on landholdings and Fertility.

A lack of official will to curb population growth stems from incomplete knowledge about the causes and consequences of high fertility in Africa as a whole (Clay & Johnson 1992). Even the fundamental relationship between landholding and the reproductive decisions of African farm couples is poorly understood. Conflicting theories and inconsistent evidence have led to a dispute over the causal direction of the association between the amount of land couples own or operate and the number of children they have (Clay & Johnson 1992). The description of land in the African society is associated with wealth and owned only by males. Women were never allowed to own land but they were given the mandate to cultivate it. Due to this circumstance, the woman resulted to child birth to ensure security over the piece of land she tilled.

Discussions from various writers have been sort to come up with an understanding on the mechanisms behind this interaction. After an encounter with different situations, several researches proposed two situations that can relate with this subject. An elaborate explanation would be a situation where on one hand; large landholdings may raise couples' needs for farm labour and lead to high birth rates (Thomas 1991). On the other hand, a large amount of support had been mustered for the reverse hypothesis, i.e. that family labour for the farm (due to a high birth rate) would raise a household's need for, and ability to afford, greater operational holdings (Thomas 1991). Thirdly, it is was conceivable that these two causal paths operate reciprocally (Thomas, 1991).

2.1.1 Land labour hypothesis

Several studies have documented the empirical positive relationship between farm size and the fertility behaviour of human beings and offered an explanation for it. They suggest that the number of children that in a family may be inversely proportional to the amount of land owned by a household. Easterlin (1976) building on earlier findings of Tien, (1957); Yasuba (1962); Forster and Tucker (1972), sought to explain why rural fertility was highest on the frontier and declining in older, more settled region. He proposed the bequest theory, in which inheritance was the important link between land availability and the fertility of American farm families He further stated that as family sizes enlarged, there were sub-divisions of land among the children Easterlin, (1976). This process recurred among the families until there was little or no land left and as a result family sizes reduced. Some other situations in areas such as Europe where decline in marital fertility (in the late eighteenth century) started in France was attributed to peasant proprietorship of farmland at a level unknown in the rest of Europe," and this prevalence made farmland relatively scarce. In addition, scarcity of farmland might have depressed human fertility in both France and the U.S. by reducing the economic value of children's farm labour (Clay & Johnson 1992). In a country where land markets are relatively flexible, people adapt the size of their landholdings (rented or owned) to fit with the size of family that they presently have. The centrality of land to rural economic (rural income) and social structure as suggested by Schutjer, Stokes & Poindexter, (1983) states that the distribution of this resource is important to an understanding of fertility behaviour of women within the rural sector.

Studies of developing countries do not differ from the developed countries. In both cases, these reveal that land forms the economic foundation of most of the African countries. This study moves towards examining patterns of fertility and landholding in the Kenya. The critique of previous research leads the researcher to a small set of working propositions regarding the causal direction of the land-fertility relationship, and the conditions under which this association might be expected to hold. In the 1950s and 1960s, Kenya's fertility was roughly similar to the rest of Africa at between six and seven children per woman (Frank & McNicoll 1987). Years later, total fertility exceeded eight live births per woman (Kenya Bureau of Statistics 2010). This raised concerns with the population research agenda that was

concerned primarily with understanding why fertility levels were so high, when and how they might be expected to decline. A 1981 study of rural Kenyan male household heads argued that the principal social and cultural sources of sustained high fertility in sub-Saharan Africa had been identified accurately in John Caldwell's intergenerational wealth flows theory (Dow, Archer, Khasiani & Kekovole 1994). Consequently, the key to the timing and slope of fertility decline might best be sought by monitoring continuity or change in the patterns of wealth flow and nucleation within the family (Dow et al. 1994). Similar studies for the National Academy of Sciences Panel on Determinants of Fertility in Developing Countries reveal a comparable positive relationship on the effect of income and wealth on demand for children (Bulatao & Lee 1983).

Kenyan women have been ruled by a patrilineal kinship system for many years of men marrying more than one wife and land distribution that is only for the male gender. Land inheritance is considered not to be suitable for the girl child or the wives of the household. Their argument was that wives were granted limited use rights to land because of the persistence of indigenous inheritance systems while girls were perceived to be married off to another family where she would find land to cultivate. This is projected in Frank and McNicoll, (1987) discussion on the land fertility association based on these events. He concluded on the basis of analysis of patrilineal kinship and marriage systems in Kenya, that high fertility is a woman's way of managing her social and economic position because it ensured continued access to land and labour [children].

Kenya's transition to emotional and economic nucleation is rampant among people referred to as the urban middle class. Some of this people are from the Gikuyu tribes who have adopted the complex, specialized culture that is associated with the industrial world (Price 1996). Women from this community value the concept of educating their children rather than their labour output on farms. This might not be the case in some rural areas where nuclear families are still embedded in larger kinship groups that discourage economic and emotional nucleation (Dow et al. 1994).

Much of the research on fertility-land linkages is not predicted on the notion of patrilineal and kingship societies but largely in economic calculus. Farm size is thought to influence fertility primarily by altering the family cost-benefit evaluation of additional children. Stated

simply, farm families with access to greater land area are able to use additional family labor profitably, which provides support for a high fertility regime (Schutjer et al. 1983). That is, the ability of farm size influencing the number of living children not only by creating a demand for more children but by increasing the supply of children through higher natural fertility for labour output is evident amongst the communities in Kenya. In such circumstances, concern over long-term security is only one of a number of motives for acquiring land. On the other hand, in areas where farmland is not scarce, the reproductive behaviour of farmers might not necessary be driven by the accessibility of land. For instance, population density in South Zaire was low, and land, which would be brought into production at no cost to the farmer once it has been cleared, was abundant (Clay & Johnson 1992). This believe was however disputed by a survey undertaking Southern Zaire in 1985/86 of 240 households that could not reject the hypothesis that high fertility lead farmers to expand their holdings. The amount of land cultivated by farm households was strongly correlated with the number of household members, and was more closely related to the number of female than male agricultural workers of labour- force age, since women provide much, if not most, of the agricultural labour in Zaire (Clay & Johnson 1992). A similar study in India argues that among Indian farmers in the Punjab, high fertility (many sons) represented a means of acquiring land, holding on to land, and obtaining maximum benefits from the land through the elimination of hired labor (Mamdani 1972).

In the presence of reasonably well-functioning labour markets, moreover, it cannot be claimed that the returns to child labour in mainstream field activities such as harvesting and weeding are very much greater on the family farm than when hired out to others. There are often perceptible advantages to using family labour. It can be employed at a slightly earlier age; it entails less supervision, it avoids potential cash flow problems in paying hired labour, and saves other transaction costs incurred when hiring labour (Cain 1985). For example, evidence from Zambia suggests that the age at which children change from net consumers to net producers is about age 12 (Barrett & Browne, 1998). In Pakistan female children are judged to be net contributors to household activities between the ages of 11 and 16, and by age 18 female children effectively “repay” the time mothers spend caring for children and in other household tasks (Filmer and Pritchett, 2002). These studies suggest that even where children are resource gatherers, households do not begin to experience net benefits until they

reach age 11, and in societies where girls marry early, the actual period of net contribution to a household's income are potentially very short (Filmer and Pritchett, 2002).

Variation in farm size is thought to influence fertility primarily by altering the family cost-benefit evaluation of additional children. Stated simply, farm families with access to greater land area are able to use additional family labor profitably, which provides support for a high fertility regime (Rosenzweig and Evenson 1977). Yet there are obviously many other benefits to children beyond their immediate economic returns - including both the social/cultural benefits and longer-term benefits such as old-age security. In addition, recent demographic research has re-evaluated the contributions of children to their families in traditional societies by showing how the timing of their contributions supports larger numbers of younger siblings than would otherwise be possible Lee and Kramer, (2002) and showing how net contributions are higher when girls' contributions are measured more accurately (Sullivan & Kramer, 2006). In addition, it can be argued that the increased cost of children associated with off-farm employment of women can be avoided by families with greater access to land.

The traditional high fertility of rural populations, coupled with low mortality, serves to increase the potential importance of rural fertility patterns to growth in both individual countries and the world (Schutjer et al. 1983). With these been the situation across the Africa notably Kenya, the feature that has hit enormously is unavailability of land to sustain the growing population. An example is Kenya's situations, where unlike the olden days when a man could foster the kids of his sister by providing for them with food until they were ready to go onto the farms. Nowadays it is so difficult to the extent that he might not even be able to take care of his own kids and also the factor of education has also come in ,polygamy : (the number of men that they got married to like 3 women in the olden days can no longer be supported by the men of today).The consequence of this situation is economic insecurity amongst these populations especially those from the rural sector and in turn leads to the reduction of fertility amongst them since they no longer can provide for their young ones.

2.1.2 Land security hypothesis

The second hypothesis, the 'land- security hypothesis' as discussed by Cain (1985); Stokes & Schutjer (1982); and Thomas (1991) posits a negative relationship between land ownership and fertility, resulting from the substitution of land for children as a security asset. This ideological hypothesis is based on the idea that children are an informal insurance good just like owned land and that's why it might be economically rational to have a large number of children in an environment of harsh risk, even if intergenerational transfers do not flow from child to parent, since children provide insurance. Another author, Caldwell (2005) argues optimistically that "There is a near consensus on the pre-modern insurance value of children. Childless parent faced almost insurmountable problems in converting surpluses from their young adulthood into support for their old age.

Kenyan women are very aware of the costs of raising children and are sensitive to the economic burden of large families. In this respect, they resemble the provider-husband of the conventional nuclear family. Children, in turn, contribute significant labor services to farm and household. And probably more important, children are a major source of old-age support to their mother. Since a woman must in large measure assure her own livelihood, often with little or no claim on her husband's estate after his death, children offer a promise of old-age security that may in effect be indispensable (Frank and McNicoll, 1987). Parents on the other hand, who view children as security assets, are themselves not completely secure, due to the risk of mortality and debility - infant, child and adult. Other kinds of 'default' in the case of children include rejection of the parents in situations of rebelliousness or economic failure and in other instances those who refuse to provide support. Although in more traditional societies in which children possess a deeply engrained sense of filial obligation, this kind of 'pension plan' often works very well (de Sherbinin et al. 2006). Children, viewed as security assets by parents, are themselves not completely secure. There is, of course, the risk of mortality and debility - infant, child and adult. Other kinds of 'default' in the case of children include rejection of the parents and refusal to provide support, and the economic failure of children. Despite the risks entailed in investing in children as security assets, it is quite clear that they embody qualities that set them apart from land and for which there really are no substitutes (Frost 2010). Some researchers have made impassioned appeals for greater policy attention to fertility-environment linkages. For example, Clay and Reardon, (1998) draw on

their research in Rwanda and Madagascar to argue that intergenerational wealth flows from children to parents mean that it is economically rational for household heads to create a large pool of household labor through high fertility. Until this logic changes, they argue that fertility is unlikely to decline in rural Africa because households tend to “externalize” the costs of excess fertility by sending children away who are unable to contribute to household income

It has been proposed that the effects of land tenure can counteract the relationship between farm size and family size. Under this land-security hypothesis, land tenure security creates economic security that lowers the need to invest in large numbers of children (Schutjer & Stokes 1982; Cain 1985). Greater security is associated with land, higher living standards, access to health care and greater educational opportunities, all of which promote lower fertility. Studies in the Philippines, Egypt, Ecuador, Iran, India and Mexico provide evidence for the negative relationship between tenure security and fertility (Vlasoff and Vlasoff, 1980, Schutjer et al., 1983; Carr et al., 2006). Under this land-security hypothesis, land tenure security creates economic security that lowers the need to invest in large numbers of children (Schutjer & Stokes 1982). In the case of other “events that threaten normal consumption streams” and a couple owns a sufficient amount of land then they will not need the insurance provided by having many children.

A more direct test of the relationship between land ownership and fertility is provided by Vlassoff and Vlassoff, (1980) in their study of old age security and the utility of children in rural India. They found that respondents who held optimistic attitudes about their old age security owned an average of 9 acres of land while insecure respondents owned on average only 4.9 acres of land. Data associated with Schutjer and Stokes, (1984) paper, shows that women in households with secure title were having two-thirds fewer children than those without such titles. Thoughts by other authors promote the perception that children can replace landholdings. They conclude that children are a security measure for their old age. These theories are in line with a study undertaken among all Kenyan communities to show the association of household income and consumption, and fertility. Results of this association show that between log consumption per adult and fertility for women aged twenty-five to forty-four is a representation of a negative slope, suggesting that a 10% increase in income is associated with a 1% decrease in fertility (Schultz, 2005).

Regions in some countries like Nepal that entail large communal land, more the existence of individual family land argue that rich families are far more able to take advantage of any such communal resources instead of giving birth or using immediate family labour (Macfarlane 2003). On the other hand another anthropological study of the same country (Lamjung in the Western Hills) by Subedi, (2006) found that, “parents intend to depend on children and that there is a sense of moral obligation for adult children to take care of their parents in old age”. This study looks at pensions as an alternative means of old-age support as well as landholding. Unfortunately, the comparison is made between those who depend on land alone and those who also have an income of some form (i.e. a pension). No difference was found between these two groups, but then the hypotheses would not necessarily predict one. Subedi, (2006) comes to the conclusion that “social security benefits played no role in fertility transition” but nonetheless he is convinced that old-age security is a pervasive motive for childbearing. Hawley, (1955) also presents data illustrating that farm tenants generally have smaller families than farm owners, which could be taken as support, albeit tentative, for the land-security hypothesis.

Although children are an important source of farm labor for women, women do not in any sense have "entitlement" to this labor, but rather enjoy "use" rights to it, a situation somewhat analogous to their relationship to land. To summarize, Kenyan women have traditionally lacked full entitlement to land or to the labor services of their children, but nevertheless have generally enjoyed secure access to both. In many other regions of the world, societies are similarly patriarchal and ownership of assets is not infrequently patrilineal. The land-security hypothesis holds that landownership is also able to provide security in old age or in the case of other “events that threaten normal consumption streams” (Cain 1981) and that if a couple owns a sufficient amount of land then they will not need the insurance provided by having many children. Or, rather than a threshold effect it may simply be that children and landholding may be used as straightforward substitutes for one another when being used as a form of insurance (Frost 2010). Furthermore, Caldwell (2005) argues optimistically that “There is a near consensus on the pre-modern insurance value of children. Childless parent faced almost insurmountable problems in converting surpluses from their young adulthood into support for their old age. Financial institutions evolved relatively recently and most

ignore the poor and illiterate”. Finally it’s suggested that it is more useful to think of land and children as complements rather than substitutes.

In conclusion, the landholding-fertility relationship has long been neglected in mainstream ,despite the fact that there is absence of proper evidence on the topic. Admittedly, trying to separate the land-labour and land-security hypotheses is not easy, but previous attempts have failed for reasons that are rectifiable. The hypotheses have often been tested in settings where a natural fertility regime persists and while a correlation has been found in these settings; such a correlation is not pertinent to the testing of the hypotheses. Interpretation of the relationship between land and human fertility is complicated by the multidimensional nature of land. For example, land economists have long recognized that attempts to study the social and economic consequences of land distribution require considerations beyond the physical availability of land. One definition of land states that land is ". . . the sum total of the natural and man-made re-sources over which possession of the earth's surface gives control" (Barlowe 1958,). Within this broad definition, it is useful to think of land availability as having two major dimensions important to fertility decisions. First is the size of land-holding to which the family has access for cultivation. Second is the ownership of land, which includes all of the legal and institutional conditions that govern the use of property (Schutjer et al. 1983).

In general fertility patterns is rational, and fertility is high or low as a result of economic benefit to individuals, couples, or families in its being so. Whether high or low fertility is economically rational is determined by social conditions: primarily by the direction of the intergenerational wealth flow. This flow has been from younger to older generations in all traditional societies; and it is apparently impossible for a reversal of flow-at the great divide-to occur before the family is largely nucleated both emotionally and economically (Dow et al.1994). The key issue [then] ... is the direction and magnitude of intergenerational wealth flows or the net balance of the two flows-one from parents to children and the other from children to parents-over the period from when people be-come parents until they die (Dow et al.1994).

Mueller & Short (1983) claimed that “in rural areas, land is a good proxy for permanent income [and] the land effect is more consistently positive than the income effect” .They do,

however, accept that this land-fertility relationship where in a “striking consistency was found” Lee & Bulatao (1983) could easily reflect mechanisms other than the income effect and they call for more research to be done in this area. The relationship was still under fierce debate up until the early 1990s when Cleland (1993) stated that the “evidence is inconclusive” and thereafter showed no further interest in the topic. This attitude has persisted amongst a great deal of demographers ever since. While Thomas (1991) agrees that “the statistical evidence in support of the two land-fertility hypotheses, based on 14 sets of data, is inadequate” this does not lead him to conclude that this line of research should be ceased, but rather that any new attempts should look very carefully at where previous research went wrong. For example, Kleinman (1973) found an index of land concentration to be negatively related to fertility in India, but did not elaborate on the rationale for the finding. Rosenzweig and Evenson (1977) used measures of land size as well as inequality of holdings in an ecological model relating fertility, schooling, and the economic contributions of children in rural India. They report a positive effect of land size on fertility, suggesting that "reducing the inequality of holdings would increase family size in India. Within this broad definition, it is useful to think of land availability as having two major dimensions important to fertility decisions. First is the size of land-holding to which the family has access for cultivation. Second is the ownership of land, which includes all of the legal and institutional conditions that govern the use of property and the distribution of produce from the land (Schutjer et al. 1983). The theoretical and empirical literature suggests that the distribution of land use rights and ownership influence human fertility in opposite directions.

At the individual farm level, de Janvry (1976) suggests that increasing farm size should be negatively related to fertility due to the downward shift in the marginal productivity of child labor associated with increased complexity of tasks, the use of non-family labor, and labor-saving machinery. Theoretically, it would appear that if increases in farm size are accompanied by the introduction of labor-saving technology, the demand for child labor would be reduced (Levy 1985). The relevance of this hypothesis is also restricted to areas where the agricultural process is not highly mechanized since in this situation the marginal returns to labour will diminish fast with increasing farm size. Also, of course, if increasing farm size were associated with increasing use of labour-saving machinery and opportunities to use non-family labour then the marginal productivity of children would again decrease with increases in farm size. In both instances it would no longer be expected that agricultural

landholdings would bear a positive relationship with childbearing. The evidence surveyed thus far is consistent with the hypothesis that any correlation between landholding and fertility reflects a pure income effect.

By the early 1990s a reduction in Kenyan fertility was clearly under-way (van de Walle and Foster 1990). This raised the question of whether a corresponding modification in wealth flow and nucleation patterns had occurred. It seemed opportune to re-examine Caldwell's theory and to assess prospects for further fertility decline in Kenya. Some of this was as a result of the increased burden of raising a family. Attributes of the women of the 20th century is that the cost of raising children may serve as an economic burden if they from large families. For example, fathers frequently pay school fees, which can be a considerable cash outlay, but other incidental costs of school attendance and the opportunity costs (the forgone farm and household work of children) are borne by the mother. It is in their nearly exclusive role in the rearing and maintenance of children that mothers in Kenyan families are distinguished from women in most of the non-African developing world (Frank & McNicoll 1987). This is in contrast of the view that they may have large landholdings. Most of this women and men prefer to employ hired help and in turn still hold land as a security asset for their old age. While Vlassoff (1990) in his study pointed out, that most parents supported by sons in old age but still disputes that this might does not make them any better off financially than those without male offspring. This just tells us that the sex preference has no bearing on fertility motivations.

Reaction against the preconceptions of much of this research surfaced at the World Population Conference in Bucharest in 1974 where delegates from the Third World challenged the authenticity of the global population community through the now famous slogans 'Development is the best contraceptive' and 'Look after the people and population will look after itself. These slogans embodied an emerging revolution in fertility theory, namely the idea that unlimited fertility was a rational response to conditions of poverty and insecurity endemic in the Third World (Thomas, 1991). Finally these hypotheses do not, however, suggest that fertility rates can be reduced by simply arranging agricultural land-ownership in such a way as to make everyone more secure; it is an individual level hypothesis, a point which is often neglected. There are also many institutional factors which need to be considered before allowing that the hypothesis might be viable in any specific

setting. An expansion of this setting is explained through the demographic, socio-economic and family planning factors.

2.2 Demographic, Social Economical Factors and Family Planning Methods

2.3 Introduction

The study of fertility has developed significantly since Malthus proposed his theory of population growth in the late 18th century. He postulates that without any check, the population is likely to increase geometrically while resources and food supply increase arithmetically (Andorka, 1978; Ehrlich & Lui, 1997). The geometric progression of population growth would surpass the arithmetic progression of economic growth (Ehrlich & Lui 1997). Therefore, the carrying capacity of resources is not able to satisfy the population's need. To anticipate the resource scarcity and to keep the rates of population growth and production balanced, there should be some checks, one of which is a decline of fertility (Andorka, 1978). Although fertility has globally declined over times, it varies across countries and societies, even across regions within a country.

The period of 1950-2000 saw some countries total fertility rate manoeuvre in various directions, such examples are Niger, the TFRs range from 8 children per woman and 1.2 in Macao (Bongaarts, 2003). In Indonesia, according to 2007 IDHS, the TFRs range from 4.2 in East Nusa Tenggara Province to 1.8 in Yogyakarta (Indonesia 2008). African countries like Kenya, Zimbabwe, Botswana and South Africa range at 8 children. These differentials can be because of several factors, some of which influence fertility directly and some others indirectly. Such factors are socioeconomic such as religion, education, household's income, Employment status, Land useable for agriculture and literacy levels (Bongaarts, (1978); Ehrlich & Lui, (1997) among others are demographic factors as age at first marriage, duration of marriage, marital status. Furthermore are programmatic factors such as family planning programmes such as unmet needs, contraceptive use and pattern of use among others.

2.4 Social Economical Factors

2.4.1 Education

Social scientists have long observed a strong positive relationship between education and fertility, both across countries and over time. Fertility decline is seen to be widespread within most western countries due to the increase in educational attainment than Africa. It appeals to several authors that higher levels of schooling are associated to fewer children per woman (Serbessa, n.d). Education plays a crucial role in fertility differentials in both developed and developing countries. In societies where female education enrolment and attainment are higher, fertility is more likely to be lower. This is because educated women are more likely to be open minded to new ideas (and new technologies (Giyato, 2000).

The adoption and advancement of education has been a pressing issue for the African continent. The reply to this was in 2000, where all 193 United Nations member states and at least 23 international organizations established eight international development goals that they agreed to achieve by the year 2015. Of the 8 was the achievement of universal primary education (Wikipedia MDG) . The advancement to achieving this goal has been observed in African countries like Kenya, Zimbabwe, Botswana and South Africa that were the first to adopt the changes and experience fertility transition that lead to the improvement of the country's social economical situations. In Kenya the educational system has continuously revised to suit the needs of the "*common mwananchi*" (less fortunate people). The provision of education is for years been a top priority for the country. In 2007, the government passed a bill that endorsed free primary education throughout the country. The latest addition to this was the introduction of free basic education, (August 2012; a Bill was passed making learning compulsory from pre-school to Form Four). This system seeks to ensure that each individual has an equal opportunity.

Most tradition settings prefer educating their male counterparts than the females. This plays no severe impact on the reproductive behaviour of women but schooling of women seems to play greater impact on reproduction. Majority of Kenya's population reside in rural areas and most just undergone a few years of schooling such as primary education or parental schooling. Parental schooling, for example, is what most women undergo. It may be the only

form of information they acquire and chances of it lowering fertility are minimal. In the rural setting land was considered as a form of economic security of households but over the years this has security has defaulted and parents have opted to a solution of education. Thus we find that education in Kenya has been substituted to land acquisition. In particular, we use landownership inequality in 1816 as an instrument for women's enrolment rates in primary schools. The idea of using landownership inequality builds on Galor, Moav, and Vollrath (2009) who present a theoretical model where inequality in the distribution of landownership negatively affects the implementation of human-capital-promoting institutions. The results of this have seen educated women in Kenya having lower parity while those with low education or illiterate women have higher parity (Lesthaege, Shah & Page (1981); United Nations, (1995).

Sometimes education may provide an inverse relationship as stated by Bongaarts (1978) and Singh, Casterline & Cleland, (1985), who on contrary to basic belief of education and fertility perceive a different notion that more education may raise fertility as it enables women to follow through on high desired family size (Carr, Pan & Bilsborrow 2006). (Bongaarts & Watkins, (1996);Caldwell & Caldwell, (2002) also show that female's education is not always associated with fertility reduction. They find that in several African countries where socio-economic indices were higher than that of the first ones, the fertility remained constant, even increased. In contrast, several Asian and African countries where the human development index is lower had begun to experience a significant drop in fertility.

School enrolment is still hindered by majority of rural households, who perceive African children as assets. They consider children as beneficial instruments in the agricultural sector until they are married off in the case of girls or as men following up a lineage. But the situation in Kenya has undertaken a dynamic shift due to infringing laws that persuade parents to take children to school (2007 and 2012 education Bills). Furthermore, due to the high costs of bringing up children and provide better lives for their children, families are opting to reduce fertility and employ labourers to continue with work on the farms. This does not override the fact that free primary education has been introduced into the country and the lack of teaching facilities and teachers.

2.4.2 Wealth flow

Increasing costs of bearing children has of late outweighed material benefits to parents to the extent that it influences fertility and leads to reductions in desired family sizes (Makinwa 1994). This observation is of many authors that link the current cost of children with reduction in fertility. They say, a family will have fewer children when the costs of children (childrearing, housing, education) exceed capacity of family (Leibenstein, 1974). In addition, children may present to the family not only direct costs, but also lose income for the mother who gives up work to care for children. Families of rural Kenya are no exception as those with low income tend to produce less number of children than those who have high income (Kenya bureau of Statistics,2010).This situation lies with a tendency that majority of the households are still involved in agricultural production which constitutes a fluctuating economy.

Poverty has reverted this perception in some communities making an inverse correlation between wealth and fertility. In such situations, an observation is made where households with the lowest number of assets having three to four times the number of children unlike those with the highest number of assets (Carr et al, 2006). In such cases costs of children are assumed to be relatively low and the benefits high.

2.4.3 Literacy

Among the various socioeconomic determinants of fertility, education, especially female education, has received considerable attention from scholars and researchers. In developed countries it is observed that schooling enrolments and educational composition typically improved from the start of fertility transition though it is still not there yet. An array of researchers from developing countries associate higher fertility levels with illiterate women in rural areas and in poor households. Sharma and Ratherford as described in Jeffery and Basu (1996) argued that in India, "a 10 per cent increase in the female literacy rate seemed to be associated with a 0.5 decline in total fertility rate". If this were true, in order to reduce fertility, it would be necessary to "arrange for 80 per cent female literacy." (Jeffery & Basu 1996). Other studies from countries such as Bangladesh by Jeffery and Basu (1996) have shown that 10 percent increase in the female literacy is associated with a 0.5 percent decline

in total fertility rate. Akmam, (2002) has found that 80 percent female literacy is needed for achieving the replacement level fertility in developing countries. In Kenyan women in rural areas that are better placed with a little form of communication in the reading aspect have larger family sizes than their counterparts.

2.4.4 Respondents Occupation

The relationship between female's occupation and fertility is attributable to other factors, such as education, family income, and/or husband's occupation (Bongaarts 2003). This is a very big determinant since the employment rate is the one that influences age of marriage, the number of acres that one may hold and ones reproductive behaviour. To women who are working, costs and benefits of getting married, especially in developed countries, should be in their own calculations. Getting married, coupled with childbearing and childrearing, becomes a constraint for their career. Furthermore, the presence of additional births can hinder parents in competing for the increasing demand for consumer goods and opportunity for female's employment (Hoffman & Hoffman, 1973). Therefore, women's occupation pays a significant contribution to the family size of a couple (Dia, 2009). Formal employment reduces the dependency of women on agricultural production. Investments on land for agricultural production no longer exist and residents of rural areas are now migrating to urban centres in search of jobs and better lives. The result of this is costly provision of education for children and higher living standards which cannot be sustained with large family sizes. This leads to low fertility rates amongst these women. This outcome is supported as well in rural areas due to the high cost of living.

2.4.5 Income

Income, either household or wife's income has a negative correlation with fertility. As income increases, the childrearing cost rises because of the improvement of the standard of living (Hoffman & Hoffman 1973). Despite its role in fertility decline, how strong the impacts are is disputable. This is because female's income does not necessarily reflect the degree to which women have control over the household's resources (Dia 2009). In addition, Dribe, (2009) finds for Sweden that increasing female relative wages were associated with declining fertility among women over 35. This result is consistent with Schultz, (1985) who

finds that a quarter of the decline in the Swedish total fertility rate from 1850 to 1910 can be explained by the 10 percent rise in the female to male wage ratio.

2.4.6 Religion

Numerous findings show that religious norms and beliefs play a vital role in building up and developing a family's perception on family size. In the United States of America it was found fertility is high among Muslims and Catholics (Hoffman & Hoffman 1973). He further states that some religious fundamentalists such as Catholics, Orthodox Jews, view children as the blessings from God, that is why contraception is against the procreation. Meanwhile, high fertility among certain groups of Hindus in India is due to son preference related to the religious rites, in which the male children are responsible for burning their parents' dead body (Hoffman & Hoffman 1973).

Similarly, traditional Muslims are characterised by the view of God's procreation. They believe that childbearing and childrearing are God's destiny. Their view is based on God's revelation saying that God has provided all His creatures in the universe with what they need. In other words, whatever happens to anyone has long been predetermined by God before they were born. Besides, Islam teaches embracer the fact that children are responsible for taking care of their old parents. A dutiful child is one who looks after his/her parents in their old age. Therefore, the more children parents have the more secure will they be in their old age. Catholics, "... the religious discourse supported the husband's rights to frequent sexual intercourse and encouraged him to trust providence to bring up many children, thus sustaining high levels of fertility" (Praz 2009). On the other hand, however, Islam also teaches its embracers that God will never alter the countless they change themselves. The latter view has partly led the implementation of family planning programme in Indonesia to success. Praz, (2009) finds that sister religions, Protestant and Catholics in Switzerland have different perceptions on children. Protestantism teaches that to act in accordance with the pastoral requirement of people, protestant families should alter their sexual behaviour and limit the number of children.

The association between fertility and religion lies in the fact that religion is generally considered to be associated with traditional views and values on gender roles in the household (Faroutan 2008). Women are predetermined to bear the role of childbearing and childrearing. However, this decreases as the precedent socio-economic variables such as education increase. Therefore, religion can be interfered with by other factors to influence the ultimate change of fertility. (Dia 2009)

2.4.7 Own land useable for agriculture

First, abundant land but scarce capital, lack of infrastructure, and labor scarcity all imply that the economic returns to land are low relative to labor, contributing to high desired family sizes and hence reproduction (Caldwell & Caldwell 1987). Nevertheless, these land uses may be adopted at any stage in the life cycle and affect the demand for labor. Little is known about the effects of different forms of land use on fertility in a frontier environment. For example, controlling for the stage of the family lifecycle (women's age is a good proxy), raising annual crops requires more labor and may therefore promote higher fertility than raising cattle.

Another important characteristic of the frontier is the limited access to wage labor employment and schooling for women, which decrease the economic value of women's time relative to that of children, increasing desired family sizes (Singh et al. 1985). For example, more educated women have considerably lower fertility in agricultural frontiers in countries as diverse as Guatemala and South Africa. Kassena-Nankana tribe in Ghana, for example, where patriarchal hierarchy is still strongly adopted in society, women are powerless to have access to household resources (Adongo et al. 1997). Unfortunately, in that society, women are forced to give as many births as possible especially for sons because male children are expected to succeed their fathers as breadwinners (Adongo et al. 1997). In addition, having many children becomes the source of prestige

Farm size in Kenya during the 1990 was negatively related to childbearing during the subsequent decade: Women on the smallest farms had more than double the number of births as women on the largest farms. However this relation was not significant when controlling for women's age as older women tend to live on larger farms due to capital accumulation and

the benefit of having arrived earlier on the frontier and thus, the ability to select preferential land. All other groups had substantially higher fertility than the control group of households that lost more than 10 ha. This may suggest that households expand farmland as a response to or in preparation of a birth in order to have more land in the future for children. However, only substantial decreases in land prompt a fertility reduction response.

2.5 Demographic factors

2.5.1 Age at Marriage

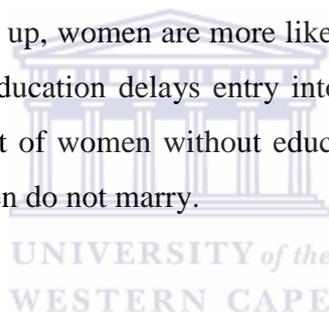
Age at first marriage becomes one of the most influential factors of fertility because it is the legal form of sexual union (Lucas & Meyer 1994), although this may fade out in Western societies, which characterizes the onset of a woman exposed to sexual intercourse. The earlier a woman gets married, the longer she is exposed to sexual intercourse and the longer she is exposed to the risk of pregnancy.

Age at first union is relatively young in most high fertility societies (less than age 20 on average). Kenya for instance, was accompanied with women marrying at a tender age but that has risen during the last half of the 20th century. Although age at marriage may continue to rise in Kenya, we can clearly expect little further impact on fertility (Blacker 2009). In order to facilitate a greater impact, age at first marriage should be incorporated with education. A study of 26 developing countries sponsored by the United Nations finds that age at marriage invariably increases with the level of education in all of the countries examined, despite the fact that "the age at marriage varies widely across countries". Education tends to increase the age at first marriage, thereby decreasing the number of years that can be devoted to child bearing. The relationship between women's education and age at marriage show that in almost every country, women with education get married "roughly two to five years later than uneducated women" (Cleland and Jejeebhoy 1996). Moreover, educated women are more commonly engaged in employment than their uneducated counterparts which uplifts women decision-making autonomy, interaction with a wider world", emotional autonomy and self-reliance. Due to higher attainment in education, age at first marriage in countries like Indonesia, for instance, has increased from 20 years in 1971 to 23 years in 2000 (Indonesia 2008). Furthermore, employment can also stimulate women to get married later.

In contrast to the accounts, women living in rural areas are more likely to get married at a younger age. It is not unusual for peasants in rural areas of developing countries like Indonesia, for example, to arrange their young daughter's marriage in order to hand over the responsibility for feeding their daughters. Boograts (1984) presents results with significant presentation of age at marriage. This implementing that age at marriage in first world countries promotes decline in fertility. A stronger impact on fertility decline is observed in Indonesia, Thailand, Malaysia and Philippines to the rise in age at first marriage (Ogawa 1982). However, this impact is not solely because of the age alone, but of its antecedents. The fast growth of population in Indonesia might be due to a combination of early marriage and abundant supply of food (Reid 1993). This situation is as well relevant to Kenya rural communities.

2.5.2 Marital status

As attainment in education levels up, women are more likely to get married later (McCarthy, 1982; Ferry and Smith 1983). Education delays entry into marital unions. For example, in Thailand, only about 1.9 per cent of women without education do not marry, whereas 14.6 per cent of highly educated women do not marry.



2.5.3 Age group

In Kenya the fertility rate was 5.8 in the 1984 KCPS, 4.4 in the 1989 KDHS, and 3.7 in the 1993 KDHS. But then it levelled out and the 1998 KDHS gave a figure of 3.8. These figures were consistent with the age cohorts of women (15-19 in 1993 and 20-24 in 1998; 20-24 in 1993 and 25-29 in 1998...etc). Except for the youngest cohort (15-19 in 1993), they show small but systematic increases in ideal family size as the women aged, and such consistent changes are unlikely to have been the result of sampling errors (Blacker, 2009). During these periods noticeable changes in ideal family size were in the older cohorts where the increments in the numbers of children actually born will have been smallest. The breakdown of the 1998 figures by numbers of living children, by residence (urban/rural), province and education reveal few categories whose ideal family size was less than 3. Only the younger women in Nairobi and Central Province, and those with secondary or higher education aged under 25, showed figures of fewer than 3, and even in these categories none went as low as

2.5 (Blacker 2009). Kenya's system of reproduction has not changed exponentially; the age group with the highest fertility is still the young.15-19.

2.5.4 Household heads

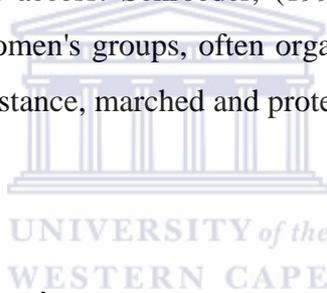
A trend of rapidly increasing landlessness in rural Kenya is now evident with the proportions of landless rural households rising rapidly. This proportional has increased tremendously, almost double the population growth. Landlessness and the poverty of landless agricultural labourers are problems that necessarily command the attention of development policy planners in Kenya at present and will do so increasingly in the future.

The rule of division amongst all but a small minority of tribal groups of Kenyan households is patriarchal. Upon marriage a woman normally moves to her husband's locality and becomes part of his lineage (Cain 1978). This move out rightly gives her privilege of land cultivation within the household. Overall, not even 2% of land is owned by women in Sub-Saharan Africa. A 2001 study of the economic commission for Africa (eca) in Kenya notes that although women contribute 75% of labour, they own only 1% of the land and 5 % are registered landholders in Kenya. On average, men's land holdings were almost three times the women's land holdings (Deere & Doss 2006).

Traditionally a woman could only own land through the husband and in respect to the man's death land was only available to her if she had older mature children to take over from where the father left. But in circumstances the children were not of age, the land was taken over by the relatives until the children reached of age. This situation perfectly illustrates a rural setting that has overtime suppressed the rights of females and supported further the course of the male species. The death of the patriarch has a number of adverse economic repercussions. At the simplest level, it entails loss of the patriarch's earning power. In rural Kenya, where many landed households must supplement farm income with other income sources in order to meet consumption needs, the loss of a patriarch's supplemental earnings may precipitate the mortgage or outright sale of land in order to provide for consumption needs. In addition, the death of the patriarch may precipitate a managerial crisis if there is no mature male family member with sufficient managerial experience and knowledge (Cain 1978).

In conclusion, ownership of family land provides father leverage over his sons, which gives him a degree of control over the timing of the sons' departure from his household and may enable him to expropriate some of their labor and output after they have established separate households (Cain 1978). A landless father on the other hand does not have this leverage. Indeed, it is not uncommon among the poor for a mature unmarried son to remain a member of his father's household while having effectively taken control over his own earnings. Furthermore the death of a father in a family has a major effect on the economic structure of a wife in the family. Cases of the widow not having adult sons faces the relatively bleak prospect of living with a married daughter or returning to her family of birth. While a man can freely remarry if his wife dies, there is social proscription against remarriage of widows. A landless widow with no adult son to depend on may quickly be reduced to the status of vagrant beggar. (Cain 1978). Finally, Dei, (1994) makes clear that women's access to the land market is not necessarily free from conflict, and suggests that it took organized action on the part of women to clear paths of access. Schroeder, (1993) and Newbury, (1984), among others, discuss cases in which women's groups, often organized with church, donor agency, and nongovernmental agency assistance, marched and protested to local state authorities.

2.6 Family Planning Programs



2.6.1 Knowledge about Contraception

It is clear that education affects fertility indirectly. It operates through proximate determinants, such as contraceptive use. Women with education have knowledge of and attitude towards family size and birth control which are implemented in the adoption of contraceptive use.

In many developing countries, it has been observed that even women who are highly educated do not have an adequate understanding of reproductive physiology upon which the success rate of traditional and modern contraceptive methods depend. Moreover, there still exists a large gap between knowledge and actual practice of contraception. Education facilitates the acquisition of information about family planning and in addition it imparts a sense of control over one's destiny, which may encourage attempts to control childbearing as well. Furthermore, it also affects the supply of children through paths other than its

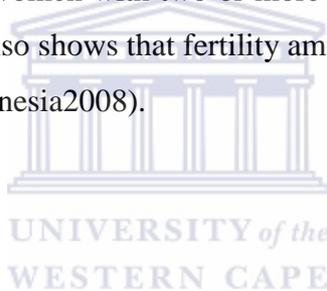
influence on deliberate fertility control. Cleland and Jejeebhoy, (1996) argue that "the role of schooling becomes more apparent in terms of detailed knowledge: the number of methods, especially non-terminal methods, known; the correct use of a particular method; and from where a particular method can be acquired. For example, they refer to a study showing that in India, 95 per cent of the women with secondary education knew about the IUD whereas only 39 per cent of the uneducated women had the knowledge of this method of birth control.

With regard to the contraceptive use, numerous studies have been conducted which show a significant effect on fertility. It seems that there is a significant differential in fertility between societies where contraception is widely practised and societies who do not use contraception. The greater decline in fertility in South-east Asia in the last three decades, for example, is partly because of the wide distribution and use of contraception (Ogawa 1982). Indonesia on the other has alone reduced its fertility from almost six children per woman in the onset of the initiation of the family planning programme in the 1960s to less than three children per woman (Indonesia 2008). This achievement is partly because of the nationwide distribution and voluntary contraceptive use (McNicoll & Singarimbun 1983). However, the distribution and usage of contraception should take account of the excess and side effects of the contraception used. During Soeharto's regime in Indonesia, it was not rare for policy makers on the family planning programme to race for the target, not for the quality of service (Hull, 2002).

Kenya's fertility decline can be attributed to increased contraceptive use. A couple of surveys done show that the proportion of currently married women aged 15 to 49 currently using a modern method of contraception increased from 9.7 per cent as shown by the 1984 Contraceptive Prevalence Survey to 17.9 per cent in the 1989 KDHS, 27.3 per cent in the 1993 KDHS, and 33.7 per cent in the 1998 KDHS. On the basis of these figures, the rate of uptake appears to have slowed up: it increased by 9.4 percentage points in the 4 years between 1989 and 1993, and by only 6.4 percentage points in the 5 years between 1993 and 1998 (Blacker 2009). Kenya as well has women engaging in non-agricultural work who are more likely to use contraception compared to those who work as farmers or who are currently not working. Inversely, Muslim women are 0.3 times less likely to use contraception as their non-Muslim counterparts. Meanwhile, higher educated women are 1.5 times more likely to

use contraception as their uneducated counterparts (Dia 2009). Additionally Pakistan women with at least primary education, for example, seem more willing to adopt family planning than their uneducated counterparts. Their educational backgrounds do not build up their desire to preferred family size, however. Rather, these help them operationalise the desire by adopting modern contraceptive methods (Casterline, Sathar & Haque 2001). Furthermore, Indonesian women with secondary education have increased from 38% in 2002 to 46% in 2007 (Indonesia 2008). However, in the initiation of the family planning programme in late 1960s, it was not education alone which enhanced the adoption of birth control, but because of programmatic intervention conducted by the government (Dia 2009).

According to IDHS 2007, there is a positive relationship between educational attainment and contraceptive use, but inverse between education and fertility. As education increases, the number of women using modern methods of contraception increases from 8% among women with no children to 64% among women with two or more children (Indonesia2008). Despite the rising trend, the IDHS 2007 also shows that fertility among uneducated women was lower than women with education (Indonesia2008).



2.6.2 Unmet need

Many of the high fertility countries have moderate high levels of unmet need for family planning. The prevalence typically ranges from one-fifth to one-third of married women. Some situations where unmet needs are prevalent are in cases where International organisations seem to be ignoring the rapid increasing population and instead of dealing with reproductive health issues are caught up in poverty and HIV issues. It is of utmost importance that birth control which is now affordable (a 3 month supply of birth control pills is \$0.25 only) be made available to women. Men should be made to use condoms but empowering women in such situations is a plus.

Another contributing factor is that very few women in countries have access to birth control. I remember there was a time when Kenya had one of the highest fertility rates in the world but thanks to a well-orchestrated birth control campaign those figures fell to manageable levels. It also does not help that in many of these high birth rate countries, culture encourages women

to have many children as a sign of fertility ignoring the difficulty in providing for all of them. In Kenya, 46 percent of married women use contraception, with 39 percent using a modern method. (It is contended that issues of population growth will continue to be an important frontier of international health. Kenya's case is examined and its achievements in arresting its population growth are analyzed. The case is made that Kenya's experience is transferable to other countries in Africa. It is only by managing population numbers can issues such as healthcare, access to clean water, AIDS, economy and other issues can be dealt with in an effective manner before the growing population of many of these countries render their governments' efforts null (Nowak et al. 1991).

Furthermore, the mean road distance to the nearest market for all households may be another unmet need that is experienced by many rural women of Kenya. Studies have discussed of women who walk many kilometres in such of medical attention during birth of even to seek medical attention for ailments. The relationship formulated from unmet needs of family planning forms a negative impact on fertility. Women are less involved in family planning programs due to lack of knowledge and unable to access the drugs. The experience of distance plays a negative role in cases where women giving birth lose their children and without knowledge of why that was the case they try for another. A scale of evidence of this situation is 1992 Demographic and Health Survey of women reporting a birth during the period were located further from a community center (24.3 km.) compared to women reporting no birth (18.9 km.). In households over 30 km to a market, 64% of women reported a birth compared to 43-50% for the remaining women (Kenya Bureau of Statistics, 2010).

2.6.3 Preferred waiting time

Prolonged breast-feeding is one of the traditional practices that serve as a means of contraception. With increases in the levels of education of women, the period of breast-feeding tends to decrease. Breast feeding practices are affected by education through knowledge autonomy, decision-making autonomy and emotional autonomy .The kind of relationship that was observed in the case of breast feeding is also observed when one examines the relationships between post-partum abstinence and fertility. Women's compliance to the traditional norms that encourage prolonged post-partum abstinence tends to decline with increases in the levels of female education (Cleland and Jejeebhoy, 1996).

Tradition women have for year's prolonged post-partum abstinence and breast-feeding in order to decrease their fertility. This is was the only form of family planning method that must had knowledge about. But nowadays, changes have enhanced the preferred waiting time and still decreased fertility.



CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

This study uses secondary data taken from the latest survey on population and health in Kenya, 2008/2009 Kenya Demographic Health Survey (KDHS) and some methods and procedures used to estimate the correlation between fertility and landholdings. In addition, the impact socioeconomic, demographic and family planning programs on this correlation. This chapter will be divided into five sections. The first section portrays the setting of the study, second section source of data, third section is the study population with an in-depth description of the inclusive and an exclusive criterion that automatically leads to the representative sample, the fourth section is a description of the research design. The fifth section will highlight the variables to be used, the validity and reliability and limitations of the study. The sixth section will expound on the methodological procedures for the analysis of data.

3.1 Setting of the Study

This study is based in Kenya, in East Africa with the capital and largest city been Nairobi. Kenya lies on the equator with the Indian Ocean to the South East, Tanzania to the South, Uganda to the West, South Sudan to the north-west, Ethiopia to the north and Somalia to the north east. Kenya covers 581,309 km² (224,445 sq mi) and has a population of about 43½ million with an estimated growth rate at 2.7% per year (Central Intelligence Agency, 2009). The country is named after Mount Kenya, the second highest mountain in Africa. The country has a young population, with 73% of residents aged below 30 years due to rapid population growth; from 2.9 million to 40 million inhabitants over the last century (Central Intelligence Agency, 2009).

Land cover in Kenya is derived from several geographical regions. The first is a narrow coastal strip that is low lying except for the Taita Hills in the south. The second, an inland region of bush-covered plains, constitutes most of the country's land area. In the northwest, straddling Lake Turkana and the Kulal mountains, are high-lying scrublands. In the west is the Great Rift Valley, an irregular depression that cuts through West Kenya from north to

south in two branches. It is also the location of some of the country's highest mountains, including Mt. Kenya (17,058 ft/5,199 m). In the southwest are the fertile grasslands and forests of the Kenya highlands. The Kenyan Highlands comprise one of the most successful agricultural production regions in Africa (Rough Guides Ltd, 2006).

Kenya largely depends on agricultural production as it is the second largest contributor to Kenya's gross domestic product (GDP), after the service sector. The agricultural sector in Kenya is the least developed and largely inefficient, employing 75 percent of the workforce compared to less than 3 percent in the food security developed countries, yet this still sets Kenya at having the most advanced economy in east and central Africa. It is good to note that Kenya is known as the financial hub for East and central Africa (Yin & Kent, 2007). Although Kenya has the biggest and most advanced economy in east and central Africa and a minority of the urban population often leaves a misleading impression of affluence, Kenya is still a poor developing country with a Human Development Index (HDI) of 0.509, putting the country at position 143 out of 185 one of the lowest in the world (Yin & Kent, 2007). This is a clear indication that half of Kenyans live in absolute poverty.

Since 1963 when Kenya gained its Independence the country was divided into eight provinces with the capital, Nairobi, been its regional commercial hub. In addition, Kenya's capital is home to Kibera, one of the world's largest slums. But the enactments of the new constitution following a referendum in August 2010 lead to the division of these provinces into 47 semi-autonomous counties (Oparanya 2010). Of these areas, comprises of 42 ethnic communities, with the predominant tribes such as the Kikuyu, Luhya, Kalenjin, Kamba, Gusii and Luo. Kenya's various ethnic groups typically speak their mother tongues within their own communities. The two official languages, English and Swahili, are used in varying degrees of fluency for communication with other populations. English is widely spoken in commerce, schooling and government (Brown, Asher and Simpson 2006). Peri-urban and rural dwellers are less multilingual, with many in rural areas speaking only their native languages. An additional aspect is that Kenyans belong to the Christian community (83%), with 47.7% regarding themselves as Protestant and 23.5% as Roman Catholic (Oparanya 2010).

3.2 Source of Data

The study is based on the analysis of secondary data obtained from 2008/9 Kenya Demographic and Health Surveys (KDHS) and it is used to complement the quantitative results. Kenya Demographic and Health Survey (KDHS) is responsible for collecting and disseminating accurate, nationally representative data on health and population in Kenya to provide up-to-date information for policymakers, planners, researchers, and programme managers (Kenya Bureau of Statistics, 2010). This survey was a follow-up to the 1989, 1993, 1998, and 2003 KDHS surveys.

3.2.1 Description of the Kenya 2008/2009 DHS Data

This study used secondary data which is collected by the government of Kenya after every 5 years. This 2008/2009 Demographic Health Survey is a follow up of the 1989, 1993, 1998 and 2003 surveys. The survey utilised a two-stage sample based on the 1999 Population and Housing Census and was designed to produce separate estimates for key indicators for each of the eight provinces in Kenya (Kenya Bureau of Statistics, 2010). The KDHS is household-based, and samples were drawn from the population residing in households within the country. It collected information on demographic and health issues from a representative sample of 10,000 households of whom 8,444 were women at the reproductive age of 15-49 and 3,465 men age 15-54 years. The intention of the sample was constructed to allow for separate estimates for key indicators for each of the eight provinces in Kenya, as well as for urban and rural areas separately (Kenya Bureau of Statistics, 2010).

The 2008-09 KDHS survey covered the entire country, including the arid and semi-arid districts and especially those areas in the northern part of the country that were not covered in the earlier KDHS surveys. Compared with the other provinces, fewer households and clusters were surveyed in North Eastern province because of its sparse population. In order to compensate for this, a deliberate attempt was made to oversample urban areas to get enough cases for analysis. As a result of these differing sample proportions, the KDHS sample is not self-weighting at the national level; consequently, all tables except those concerning response rates are based on weighted data. Furthermore, the whole survey was conducted over a three-

month period, from 13 November 2008 to late February 2009 (Kenya Bureau of Statistics, 2010).

The 2008/9 KDHS used three questionnaires to collect data namely; the Household, Women's, and Men's Questionnaires. The three questionnaires were then translated from English into Kiswahili and 10 other local languages (Kalenjin, Kamba, Kikuyu, Kisii, Luhya, Luo, Maasai, Meru, Mijikenda, and Somali). The questionnaires were further refined after the pre-test and training of the field staff. The tool of collection of this is designed in three formats. The first is the household questionnaire which records all basic information on the household members and visitors with its main purpose of identifying women age 15-49 and men age 15-54 who were eligible for the individual interviews. Second is the woman's questionnaire used to capture individual information from all women age 15-49 such as respondents background characteristics, reproductive history, husbands background characteristics, nutrition, maternal mortality, gender violence and lastly was the Man's Questionnaire was administered to all men age 15-54 years living in every second household in the sample. The set of questionnaire administered were similar to that of a woman's questionnaire but it was shorter because it did not contain questions on reproductive history, maternal and child health, nutrition, maternal mortality and domestic violence. My study will use the woman's and household questionnaires (Kenya Bureau of Statistics, 2010).

KDHS is considered as the most powerful tool for development for third world countries, it has managed to move the world into the modern era of evidence based policies. KDHS has been of great importance as it's helped identify areas, in which prevalence of most cases like HIV should be persistent ;It is a triumph of initiative and vision on the part of UNAIDS and quality information all over the world; It has situated/ strategized developing programs for interventions, been able to identify gaps and where to target your programs, emerging global, most extensive source national representative population data that includes some of the most replicable information of domestic violence. It has increased an arena to support the use of data to inform policies and programs, lastly, it purposes as a teaching tool and threshold for many scholars (researches).DHS results is what will continue to improve our worlds(Kenya Bureau of Statistics, 2010).

3.3 Study Population and Sampling

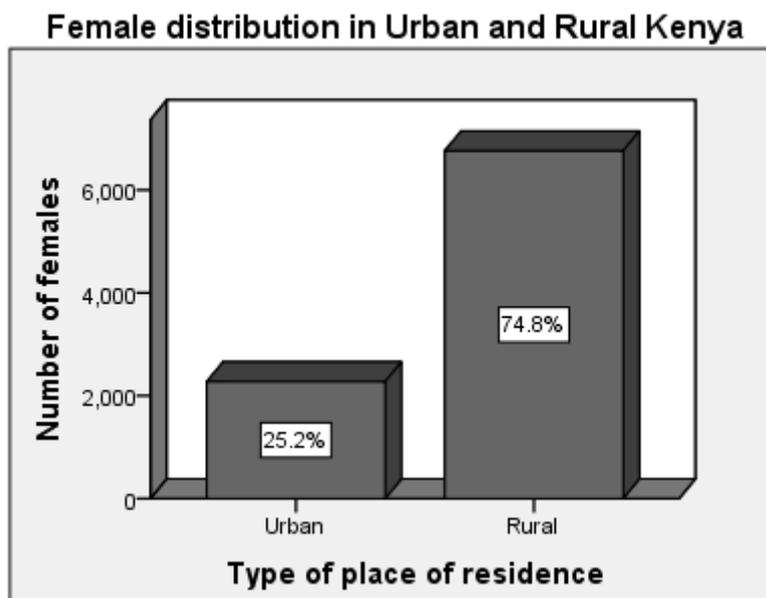
The 2008-09 Kenya Demographic and Health Survey (KDHS) is a nationally representative sample survey of 8,444 women age 15 to 49 out of the eligible, 8,767 women thus yielding a 96 percent response rate and 3,465 men age 15 to 54 out of the eligible 3,910 men, yielding an 89 percent response rate. This study selected a representative sample of 10000 households, of this a total of 9,936 households were selected in the sample but eventually enumerated a responses from 9,268 that were occupied at the time of fieldwork yielding a response rate of 98 percent. This sample was selected from 400 sample points (clusters) throughout Kenya.

3.3.1 Target population

A total of 9,936 households were selected in the representative sample, of which 9,268 were occupied at the time of fieldwork and thus eligible for interviews, yielding a response rate of 98 percent. Among the households a sample of 8,444 eligible women age from both the urban and rural sector were found to be eligible for woman's questionnaire. Table 3.1 shows that of the 9034 women interviewed, 2273 reside in urban areas and 6761 reside in rural areas. This table reveals that 70.85 who are the majority of the women reside in rural areas. From this sample only 6761 women who reside in the rural sector of Kenya are eligible for this study.

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Table 3.1 Percentage distributions of Females in both Urban and Rural Kenya



3.3.2 Inclusive and Exclusive Criterion

The Kenya DHS 2008/2009 data collected and to be analyzed includes both males and females of all ages around all areas in Kenya. It used a household questionnaire which acquired background characteristics from this sample. Of this population a further selection of men and women between the ages 15-54 and 15-49 respectively who were eligible for the man and women questionnaire were obtained. Our main focus of study is of rural women and so a further assortment was done that disqualified all males and women who reside in rural areas thus leaving us with a representative sample of women residing in rural areas as our base of study.

3.4 Research Design

(Burns and Grove, 2001) describe research design as a blueprint that is employed to conduct a study that maximizes control over factors which might have an interference with the validity of the findings. This process follows a set of guidelines and instructions that would address the research problem in the most economical way. This study will undertake one of the research design methods referred to as cross-sectional. A cross-sectional study was used from a class of research methods that involve observation of a whole population at a specific point in time and to provide data on the entire population under study (Ryder, 1965). Cross-sectional studies are descriptive studies that encompass much government sponsored research including the population census, the collection of a wide range of social indicators and economic information such as household expenditure patterns, time use studies, employment and crime statistics. This information was collected in form of questionnaires that collected information about peoples past history, background characteristics. From this based on the study we gathered information on the fertility patterns of women and their accessibility to land. It further gathered information on their socio-economic characteristics, demographic and family planning perceptions.

3.5. Operational definition and description of variables

The independent variables included in this study are selected by reviewing the available related literatures. They fall under the demographic, socio-economic and family planning variables. The dependent variables are children ever born, number of living children and

Ideal number of children. These are fertility variables used to describe the parity of a woman and her ideal family size. Taking into account theoretical considerations as well as the results from a series of exploratory models, independent and dependent variables considered in the analysis are stated below with their definitions.

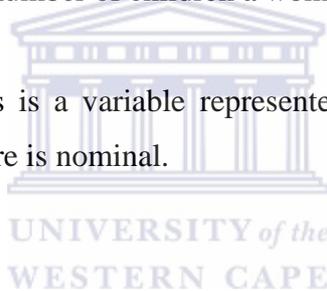
3.5.1 Dependent variables

The dependent variables in this study explain fertility behaviour of rural women in Kenya. From them we shall look at the parity of each individual woman and her decent family size. This are described in 3 important indicators such as children ever born, number of living children and Ideal number of children.

Number of living children: - The respondent's total number of children still alive at the time of survey. This is a numerical variable.

Children ever born: - The total number of children a woman gave birth in her life time at time of the survey.

Ideal number of children: This is a variable represented as 6 -6= and 7 -no numerical response rate. The form of measure is nominal.



3.5.2 Independent Variables

Independent variables are grouped into three categories. These are demographic variables, socio economic variables, and the family planning variables that have been shown in earlier studies to be influential in fertility and landholdings. The same variables are also used to assess their impact on the behaviour of rural women in Kenya.

3.5.2.1 Socio-economic variables

Highest education level: It refers to the highest education qualification of individuals in the household, in line with the Kenya 8-4-4 system. Its represented in 5 categories and coded as 0 – Did not attend school/missing attended, 1 –Primary, 2 –Post primary/vocational, 3 – Secondary/A level, 4 –College/Middle level, 5-University.

Literacy: It is a variable represented as 0 –Cannot read at all, 1 –Able to read only parts of sentences, 2 –Able to read whole sentence, 3 –No card with required language, 4 –Blind/Visually impaired.

Occupation: These refers to both the Partner’s and respondent’s occupation and are grouped into different categories containing groups that are not working to those doing skilled, unskilled labour to technical jobs.

Wealth Index: In this category no changes was done as the pre-codes were taken for the analysis. 1 is used to indicate poorest household, 2 for poorer households, 3 for middle income households, 4 for richer households and 5 for richest households.

Who decides on how to spend money: as 1 –Respondent alone, 2 –Respondent and husband/partner, 3 –Respondent and other person, 4 –Husband/Partner alone, 5 –Someone else, 6 –Other

Type of earnings for work: These represents the mode of payment for jobs done by women thus 0 –Not paid, 1 – Cash, 2 –Cash and Kind,3 –In kind only, 6 –Other.

Sex of household member: This is binary variable coded 1 for males and 2 for females. The reference category is females.

Type of residence: This is binary variable coded 1 for urban areas and 2 for rural areas. The reference category is rural areas.

Religion: Kenya comprises of different denominations. This variable is divided into five categories as 1 – Roman Catholic, 2- Protestant/other Christian, 3 –Muslim 4- No religion 96- Other.

Own land usable for agriculture: It shows the number of women who own land, used for agricultural production. It is a binary variable coded 0 for No and 1 for Yes.

Household owns structure: This variable falls in categories of 1-Owns, 2-Pays rent /lease, 3-No rent/ consent of owner, 4-No rent/ squatting.

Household owns land under structure: This describes if the land in which the household is located belongs to the woman. This variable falls in categories of 1-Owns, 2-Pays rent /lease, 3-No rent/ consent of owner, 4-No rent/ squatting.

Source of non-drinking water: This variable describes the points in which water is located in the rural sector.

Livestock, herds or farm animals: This variable shows the number of households that own farm animals. It is a binary variable coded 0 for No and 1 for Yes.

3.5.2.2 Demographic variables

Age: Respondents and their partners were categorized in age 5 year groups as 1= 15-19, 2=20-24, 3=25-29, 4=30-34, 5=35-39, 6=40-44, 7=45-49. The reference group are the respondents.

Marital status: Marital status of women was created as categorical variable. This variable is coded as 0 –Never married, 1 –Married, 2- Living together, 3 –Widowed, 4 –Divorced, 5 – Not living together.

Age at first marriage: - The age at which marriage begins is an indicator of the beginning of exposure to the risk of pregnancy, is highly correlated with life time fertility.

Age of respondent at 1st Birth: This shows the start of the reproductive process in a woman's life. Early exposure to child birth, results into a high prevalence of children ever born. This group contains continuous variables so as to account for the effects of changes of women at first births age 15-49.

Sex of the head of the household: The sex of the household head is a binary variable categorized as 1 –Male and 2 –Female. The reference group was female heads.

Entries in birth history: This measures the parity of a woman (The number of children borne by one woman). This is a continuous variable.

3.5.2.3 Family planning variables

Contraception: - It is the act of preventing pregnancy when sexually active.

Pattern of use: This shows the percentage of women using or not using any type of contraceptive.

Current contraceptive method: Women practice both traditional and Modern family planning methods.

Preferred waiting time: 0 –less than 12 months,1 -1 year,2- 2years,3- 3 years, 4- 4years, 5-5 years,6-6+years,7 – Non-numeric, 8- Don't know

Unmet need: This shows the percentage of women who have no idea of what family planning is about, unavailability of contraceptives in some areas, inactive policies addressing the same issue and distance of health clinics in rural sectors.

Children at first use: This is a categorical variable whose code represents the number of children one has at first use of contraceptives.0, 1, 2, 3, 4, 5 never used.

3.6 The validity and reliability of the study

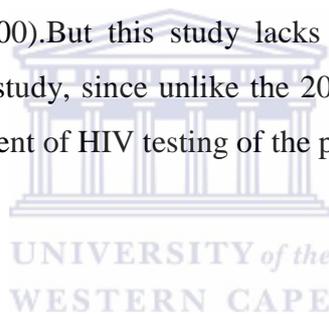
3.6.1 Reliability

Joppe (2000) defines reliability as the extent to which results are consistent over time and an accurate representation of the total population under study is as well reliable and furthermore, if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable. Kirk and Miller (1986) identify three types of reliability referred to in quantitative research, which relate to: (1) the degree to which a

measurement, given repeatedly, remains the same (2) the stability of a measurement over time; and (3) the similarity of measurements within a given time period. Reliability may also not occur if Instrument deviates from producing the same results since it is not valid. Most Instruments lack reliability when the variables in the theory are inconsistent or misinformation about the variable is unknown. This function is said to have variable errors. When the test retest method is applied in different studies it tends to come up with variable errors. The degree to which results of the data remain the same results will be difficult to establish the test- retest method, since the instruments used are not valid.

3.6.2 Validity

For this to exist the instrument must be in line with findings from the conceptual and theoretical values .This study lacks theoretical validity, as there is no face to face interaction with the subjects but it contains face validity as the research truly measures that which it was intended to measure (Joppe ,2000).But this study lacks construct validity as there is no comparison with a 2003 KDHS study, since unlike the 2003 KDHS data, the recent KDHS 2008/9 had an additional component of HIV testing of the population.



3.7 Limitations of the study

KDHS is a survey that is planned and is implemented by a team of people who are professionals at their field of study, starting from the general manager to the basic fieldworker. But from every task that faces a multitude of general population encounters some hindrances sometimes. KDHS data encountered estimates in sampling errors such as non-sampling and sampling errors. Non-sampling errors included situations such as failure to locate and interview the correct household, misunderstanding of the questions by the interviewer or the respondent, and data entry errors. Nevertheless numerous efforts were made during the implementation of the 2008-09 Kenya Demographic and Health Survey (2008-09 KDHS) to minimize this type of error, that are impossible to avoid and difficult to evaluate statistically . The computer software used to calculate sampling errors for the 2008-09KDHS is the sampling error module in ISSA (Integrated System for Survey Analysis). This module uses the Taylor linearization method of variance estimation for survey estimates that are means or proportions. Another approach, the Jackknife repeated replication method is

used for variance estimation of more complex statistics such as fertility and mortality rates. In addition, the KDHS excluded children whose mothers were not interviewed and it calculated Indicators for selected variables considered to be of primary interest for the women's and men's samples.

Lastly, in North Eastern Province compared with the other provinces, fewer households and clusters were surveyed because of its sparse population. In order to compensate for this, a deliberate attempt was made to oversample urban areas to get enough cases for analysis. As a result of these differing sample proportions, the KDHS sample is not self-weighting at the national level; consequently, all tables except those concerning response rates are based on weighted data (Kenya Bureau of Statistics, 2010).

3.8 Methodological procedure

3.8.1 Data management

Data used for analysis is the 2008/9 KDHS. These are datasets available online and access to them is through written request for research purposes for universities, institutions, agencies. This accessibility is approved by government officials. These data sets are available in the four formats that are the birth record, children record, household record and household members in the SPSS version. Before the analysis, the data were first cleaned, recoded, checked for inconsistency and some variables were joined together. The variables for this analysis were selected from 2 different files namely household record and birth record. The required variables for the analysis from birth record were joined into the household record the use of "merging data from multiple file" command of the SPSS.

In addition a cross-sectional study will be conducted with the use of a quantitative research method to access the extent of the research problem identify any attain a better link that determine the fertility behaviour of women and the ownership of land. Furthermore ,cross-tabulation, logistic regression and multivariate analysis methods are undertaken to show the relationship between some selected independent variables such age, education, marital status, contraceptive use and the 3 selected dependent variables children ever born, number of living children and Ideal number of children. These methods are used to determine a relationship or association between variables and see which variables have the most effect on

the dependent variables according to the developed objectives. The Statistical Package for Social science (SPSS) version 21.0 data analysis package was used for data capturing and analysis.

3.8.2 Statistical analysis

Firstly, univariate analysis are carried employed to summarize data and will be expressed as means, standard deviation, frequencies and percentages. This gives us a quick summary of the characteristics of the variables in the data file.

Secondly, bivariate analyses are carried to show the associations between the independent and dependent variables. The first test is the Pearsons chi-square test. This test is used to explore the relationship between *two* categorical variables. Each of these variables can have two or more categories. This test compares the observed frequencies or proportions of cases that occur in each of the categories, with the values that would be expected if there was no association between the two variables being measured. An independent variable from any of the demographic, socio-economic and family planning characteristics will be run against any of the dependent variables that are CEB, Number of living children and ideal number of children. When this is generated it forms a 2 by 2 table (two categories in each variable) encountered by SPSS, the output from chi-square includes an additional correction value (*Yates' Correction for Continuity*). This is designed to compensate for what some writers feel is an overestimate of the chi-square value when used with a 2 by 2 table. Finally an output is formulated to help us understand if there is any relationship between the independent variables and dependent variable. This is stipulated by a value seen to be significant, when the Sig. value is be .05 or smaller. In this case the value is larger than the alpha value of .05, so we can conclude that our result is not significant.

3.9 Multivariate analysis

3.9.1 Logistic regression

Logistic regression is an approach to prediction, like Ordinary Least Squares (OLS) regression. However, it is the only form of regression which is used when the dependent is a dichotomous and the independents are of any type. This situation poses problems for the assumptions of OLS that the error variances (residuals) are normally distributed. Instead, they

are more likely to follow a logistic distribution (Hosmer & Lemeshow 2004). When using the logistic distribution, an algebraic conversion is added to arrive at our usual linear regression equation below

$$Y = B_0 + B_1X + e$$

This does not mean that logistic regression assumes a linear relationship between the dependent and Independent variables. Logistic regression has only one main use in that it employs the binomial probability theory meaning that regression calculates the probability of success over the probability of failure. This is in form of two values: that probability (p) is 1 rather than 0 meaning that we are predicting the likelihood that Y is equal to 1 (rather than 0) given certain values of X. That is, if X and Y have a positive linear relationship, the probability that a person will have a score of Y = 1 will increase as values of X increase and vice versa.

Logistic regression forms a best fitting equation or function using the maximum likelihood method, which maximizes the probability of classifying the observed data into the appropriate category given the regression coefficients (Hosmer & Lemeshow 2004). In logistic regression a chi-square test is used to indicate how well the logistic regression model fits the data.

The odds ratio is defined as the ratio of the probability of occurrence over the probability of non occurrence. The odds ratio is equal to $\exp(B)$, or sometimes written e. Odds ratio terminology is perhaps easiest to understand when we are dealing with a special case in which both X and Y are dichotomous. When they are both dichotomous, the odds ratio is the probability that Y is 1 when X is 1 compared to the probability that Y is 1 when X is 0.

The models created through this test show the relationship of fertility trend dependent variables such as children ever born(CEB),number of living children ,decent family size and a landholding variable; useable land for agriculture. The independent variables comprise of socio-economic, demographic, family planning and landholding variables. The dichotomous variable are used to test the statistical significance of the independent variables by predicting

the probability that there would be change in the fertility behaviour of rural women in Kenya with given characteristics.

The logistic regression analysis will create three models.

1. A model that examines the relationship between children ever born and Independent variables.
2. A model that examines the relationship between number of living children and Independent variables.
3. A model that examines the association of land ownership with fertility trends of rural women in Kenya.

3.9.2 Multinomial Logistic Regression

Finally we will perform a multinomial logistic regression which is a simple extension of binary logistic regression that allows for more than two categories of the dependent or outcome variable. Multinomial logistic regression is a model that is used to predict the probabilities of the different possible outcomes of a categorically distributed dependent variable, given a set of independent variables (Starkweather & Moske, 2011). Our dependent variables in question are children ever born and living children. The dependent variables in question are nominal and form more than two categories.

The Independent variables to be used in this analysis are education, literacy, Wealth index, age-group, marital status, own land household owns, structure household owns land under structure, pattern of use, children at first use, respondents occupation and current contraceptive use. Some of the Independent variables contain small values or the number 0 for some of the categories. Thus we redefine the categories and make them smaller to simplify the analysis. We attempt this by recording some of the variables such as education formed into 3 categories of not educated, primary and highly educated, wealth Index changed into the categories poor, middle and rich. This was due to small sample sizes found within the

poorer and poorest category and redefined into the poor category and those within the richer and richest category redefined into the rich category. Other regrouped variable was literacy, household owns structure, and household owns land under structure, occupation into currently employed and not employed and finally current contraceptive use into using and not using.



CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.1 Univariate statistics

4.1.1 Socioeconomics characteristics

The results for some of the selected socioeconomic characteristics of the respondents and the households in general are presented in table 4.1. As for the KDHS data of 2008/09, approximately 48.7 % (N = 18857) of the respondents are men while 53.1% (N = 19860) are women. Our study has women from both urban and rural women. Of the women, 19.5 % (N = 3871) reside in urban while 80.5 % (N = 15989) reside in rural areas. Overall, majority of the women reside in rural areas.

Rural females from ages 0-80+constitute approximately 15989 and so a precise sample of those in the reproductive ages 15-49 was obtained and reported as 6761 females. In the education perspective, 3.6 % (N = 246) have attended College school/University (Higher), 22.4 % (N = 1514) Secondary School, 63.2 % (N = 4266) Primary School, 10.8 % (N = 727) preschool/No Education. Wealth Index is as shown in Table 4.1 using a measurement of poor to rich households. 22.1 % (N = 1492) poorest, 23.2 % (N = 1567) poorer, 24.9 % (N = 1683) middle class, 22.5 % (N = 1523) richer, 7.3 % (N = 495) richest. Results obtained focus the limelight majority of women lying in the poor wealth index category. This results show a huge discrepancy between the richest and the rest of the categories formulated. Agriculture production is the source of livelihood for majority of rural women initializing their source of employment. Univariate results obtained show that 68.9 % (N = 4258) currently employed (involved in different sectors of the labor market) and 31.1 % (N = 1923) unemployed (not shown in table). Method of payment may not necessary be monetary value, different forms take shape. Simple analyses performed represent 55.2 % (N = 1801) paid cash, 13.9 % (N = 455) cash and Kind, 1.6 % (N = 52) Kind and 29.2 % (N = 953) No payment. This paints a picture of hard working employed rural women. Decided on how to use the money 43.4 % (N = 712) Respondents, 46.8 % (N = 768) Respondent/husband, 9.8 % (N = 160) is decided by the Spouse and 0.1 % (N = 2) Other. Basic skills (Literacy) reported by respondents are shown in the grouped in table 4.1. Furthermore we observe findings on landholdings among rural women. This results of land size holdings show that individuals own between 0.1 and 99.9

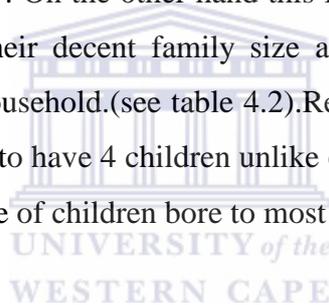
hectares. Of total landholdings an average of 6.151 (SD =20.1779) is distributed individually amongst the women. Table 4.1 shows the distribution of land accessibility with reporting findings of 5392 (79.8%) rural women owning land useable for agriculture and 1367(20.2%) don't. Furthermore, answers to questions on land holdings are shown in the table.

Table 4.1: Percentage distribution of socioeconomic characteristics of the rural women

Variable	No	%	Variable	No	%
Education					
No education, preschool	727	10.8	Piped to yard/plot	563	8.3
Primary	4266	63.2	Public tap/standpipe	424	6.3
Secondary	1514	22.4	Tube well or borehole	684	10.1
Higher	246	3.6	Protected well	882	13.0
Total	6753	100	Unprotected well	405	6.0
Wealth index			Protected spring	751	11.1
Poorest	1492	22.1	Unprotected spring	493	7.3
Poorer	1567	23.2	Natural channels of water	2042	30.2
Middle	1683	24.9	Rainwater	157	2.3
Richer	1523	22.5	Tanker truck	25	0.4
Richest	495	7.3	Cart with small tank	71	1.1
Total	6761	100	Other	21	0.3
Who decides how to spend money			Total	6760	100
Respondent alone	712	43.4	Own land usable for agriculture		
Respondent and husband/partner	768	46.8	No	1367	20.2
Husband/partner alone	160	9.8	Yes	5392	79.8
Other	2	0.1	Total	6759	100
Total	1642	100	Livestock, herds or farm animals		
Type of earnings for work			No	1086	16.1
Not paid	953	29.2	Yes	5675	83.9
Cash only	1801	55.2	Total	6761	100
Cash and kind	455	13.9	Household owns structure		
In kind only	52	1.6	Owns	5917	87.6
Total	3262	100	Pays rent /lease	534	7.9
Literacy			No rent/ consent of owner	265	3.9
Cannot read at all	962	20.3	No rent/ squatting	41	0.6
Able to read only parts of sentence	719	15.2	Total	6757	100
Able to read whole sentence	3005	63.5	Household owns land under structure		
No card with required language	32	0.7	Owns	5681	84.0
Blind/visually impaired	15	0.3	Pays rent /lease	433	6.4
Total	4733	100	No rent/ consent of owner	543	8.0
Source of non-drinking water			No rent/ squatting	104	1.5
Piped into dwelling	242	3.6	Total	6760	100

4.1.2 Demographic Characteristics

A total number of 6761 rural women fall in the reproductive group of 15-49. This group of women are analyzed and the findings of their distributed into clusters features as 23 % (N = 1555) 15-19, 19.2 % (N = 1300) 20-24, 15.2 % (N = 1029) 25-29, 13.9 % (N = 937) 30-34, 10.5 % (N = 709) 35-39, 9.4 % (N = 634) 40-44, 8.8 % (N = 597) 45-49. More so, we perform tests to enlighten us on the total number of children per household. The findings show a distribution of those who replied having as many children as 6 and more. Table 4.2 specifies on the percentages of children bore to individuals. According to the findings we reveal that majority of women in rural areas bore between 2 to 3 children at 16.7% and 17.5% respectively. Similarly a representation of number of living children is represented as 1.2% (N=45) 0, 20.1% (N=776) 1, 22.0% (N=893) 2, 17.5% (N=861) 3, 13.5% (N=701) 4, 9.0% (N=479) 5, 20.9% (N=983) 6+. On the other hand this findings differ from the thoughtful mindsets of this women with their decent family size aspirations/ideologies on the ideal number of children found in a household. (see table 4.2). Relating our results to the statement we view that most women desire to have 4 children unlike our findings for total children ever born showing conclusive evidence of children bore to most of the women between 2 and 3.



In the perspective of marital status, findings show that majority are married at 59.5% and the least are the widowed at 5.1%. Studies have shown that over the years the age at marriage has increased. This increase has also subdued the rate of age at first birth. This has been as a result of external factors effects to women's situations. Findings on this are shown as age at first birth is a mean of 18.83 (SD 3.298; - 11 minimum and 39 maximum values) and age at first marriage mean of 18.62 (SD 3.863; 9 minimum and 42 maximum values). Table 4.2 illustrates the demographic characteristics.

Table 4.2: Percentage distribution of demographic characteristics of the rural women

Variable	No	%	Variable	No	%
Age group			Number of living children		
15-19	1555	23	0	45	1.2
20-24	1300	19.2	1	776	20.1
25-29	1029	15.2	2	893	22
30-34	937	13.9	3	861	17.5
35-39	709	10.5	4	701	13.5
40-44	634	9.4	5	479	9
45-49	597	8.8	6+	983	20.9
Total	6761	100	Total	4737	100
Current marital status			Ideal number of children		
Never married	2055	30.6	0	32	0.7
Married	3999	59.5	1	72	1.5
Widowed	343	5.1	2	764	16.1
Divorced/ not living together	324	4.8	3	855	18
Total	6721	100	4	1573	33.2
Total children ever born			5	478	10.1
1	711	15	6+	761	16.1
2	793	16.7	Non-numeric response	202	4.3
3	829	17.5	Total	4737	100
4	666	14.1			
5	495	10.4			
6+	1243	26.2			
Total	4737	100			

4.1.3 Family planning characteristics

The results about contraceptives are presented below. Stating with how many of the women are currently using contraceptives. The women who responded to the questions on children were our main focus group. About 60.8% (N=2878) were not using contraceptives while 39.2% (N= 1859) were currently using contraceptives. This form of contraceptives curbs some unexpected pregnancies that may occur. In the situation, the range of children in households does clearly create real differences. The findings further show that the pattern of use and indicated as 39.2 % (N = 1859) currently using, 11.8 % (N =560) Used since last birth, 18.5 % (N = 875) Used before last birth, Never used 30.5 % (N= 1443). Both figures of current contraceptive uses and pattern of usage reflect a high percentage of those that have not into contact with contraceptives. On the other hand, patterns

of unmet needs counts for 10.5 % (N = 496) Unmet need to space, 12.7 % (N = 600) Unmet need to limit, 12.4 % (N = 588) Using to space, 26.9 % (N = 1271) Using to limit, 14.9 % (N = 706) Desire birth < 2 yrs, 13.3 % (N = 627) No sex/ want to wait, 9.3 % (N = 442) Infecund, menopausal. Regardless of all these featured aspects, the fertility rate in Kenya is still high. Lastly, the before and after birth interval is shown as preceding birth interval has a mean of 42.25(SD=27.097) while succeeding birth interval is not considered. Majority of women only consider the preferred waiting time before they begin child bearing. (see Table 4.3).

Table 4.3: Percentage distribution of family planning characteristics of the rural women

Variable	No	%	Variable	No	%
Current contraceptive method			Unmet need to space	496	10.5
Not using	2878	60.8	Unmet need to limit	600	12.7
Using	1859	39.2	Using to space	588	12.4
Total	4737	100	Using to limit	1271	26.9
Pattern of use			Desire birth < 2 yrs	706	14.9
Currently using	1859	39.2	No sex, want to wait	627	13.3
Used since last birth	560	11.8	Infecund, menopausal	442	9.3
Used before last birth	875	18.5	Total	4730	100
Never used	1443	30.5	Preferred waiting time (grpd)		
Total	4737	100	0 <12 months	307	17.8
Children at first use (grpd)			1 year	151	8.8
0	307	6.5	2 years	242	14.1
1	1228	26.0	3 years	268	15.6
2	650	13.8	4 years	120	7.0
3	407	8.6	5 years	316	18.4
4+	690	14.6	6+ years	157	9.1
Never used	1443	30.5	Non-numeric	108	6.2
Total	4725	100	Don't know	53	3.1
Unmet need			Total	1720	100

4.2 Bivariate Analysis

4.2.1 Associations of socio-economic variables and fertility patterns of rural women in Kenya

Socio economic factors are contributing factors to the slowing or fastening pace of the reproductive patterns of women all over the world. Kenya is no exception from this outcome. KDHS 2008/9 data collected has been used to explain the extent of these factors and the role they play in women. Some characteristics used in this tests included highest education attained; wealth Index, mothers occupation, Type of earnings for work, Literacy. Factoring in the educational attainment level of women and fertility patterns, a cross tabulation test was performed. The findings reported that more than half 64.7% of women in rural areas with the high fertility rates have attained primary education only while the featured 3.6% with the least fertility rates have attained higher education (College, University Studies). The findings found a statistical significant result of (P – values .000).

Poverty is the inhabitant of progression in African countries. The situation of Kenya is no exception to this case as majority of the country's population fall in this category. Many studies reveal that poorer individuals have a tendency to have many children and use them as laborers in rural farms for additional income in the households and vice versa. After an analysis on my part using the DHS data, my findings revealed an outcome of 24.5% rich individuals reported having the greatest proportion of total children ever born while the poorest report 17.9%. The association is significant at P – values of .000 and χ^2 of 341.1. As hypothesized, literacy is an important variable used to control if methods of fertility are linked to ability to read or to write of rural women.

Findings show that unlike is assumed by most individuals that those who cannot read, reproduce more is highly unlikely/not the case. Our results show 63.5% prevalence rate among those who are able to read a whole sentence. It is further shown that women occupational status reported 68.9% currently working and not working reported 31.1%. The relationship between fertility patterns and occupational status is found to be statistically significant with P – value of .000 and χ^2 of 268.26. The prevalence of the high fertility patterns is found with currently employed women. In addition the form of payment influences

the size of family. With a statically significant P – values of .000, we wrap up by stating that women paid in cash have large family sizes.

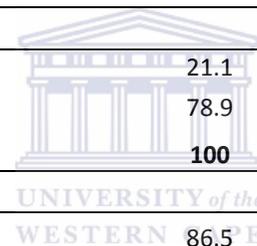
Lastly, landholding variables such as own land usable for agriculture, household owns structure and household owns lands under structure are also statistically significant at P – values of .000. (See table 4.4).This suggests that owned landholdings are equivalent to a woman’s fertility patterns. Looking at the table a woman’s reproduction is highly related to ownership.



Table 4.4: Associations between Socio-economic variables and Children Ever Born in a household

Variable	No	%	χ^2	P value
Highest educational level			385.984	0.000
No education, preschool	604	12.8		
Primary	3063	64.7		
Secondary	898	19.0		
Higher	169	3.6		
Total	4734	100		
Wealth index			341.095	0.000
Poorest	1106	23.3		
Poorer	1091	23.0		
Middle	1148	24.2		
Richer	1057	22.3		
Richest	337	7.1		
Total	4739	100		
Literacy			504.009	0.000
Cannot read at all	963	20.3		
Able to read only parts of sentence	720	15.2		
Able to read whole sentence	3007	63.5		
No card with required language	32	0.7		
Blind/visually impaired	14	0.3		
Total	4736	100		
Type of earnings for work			116.63	0.000
Not paid	953	29.2		
Cash only	1800	55.2		
Cash and kind	457	14.0		
In kind only	52	1.6		
Total	3262	100		

Respondent's occupation			268.264	0.000
Not currently working	1473	31.1		
Working	3259	68.9		
Total	4732	100		
Religion			76.421	0.015
Roman Catholic	1053	22.2		
Protestant/ other Christian	3245	68.5		
Muslim	268	5.7		
No religion	162	3.4		
Other	6	0.1		
Total	4734	100		
Own land usable for agriculture			36.876	0.000
No	999	21.1		
Yes	3736	78.9		
Total	4735	100		
Household owns structure			176.630	0.000
Owns	4097	86.5		
Pays rent /lease	400	8.4		
No rent/ consent of owner	203	4.3		
No rent/ squatting	36	0.8		
Total	4736	100		
Household owns land under structure			138.921	0.000
Owns	3921	82.8		
Pays rent /lease	334	7.0		
No rent/ consent of owner	405	8.5		
No rent/ squatting	78	1.6		
Total	4738	100		



The results for the association between socio-economic variables and number of living children in a household are presented in table 4.5. The relationship between maternal education and the number of living children found significant results of P – value of .000 and χ^2 of 338.937. On comparing the results in detail, it's noted that primary educated women have the highest fertility prevalence patterns of 64.7% and the least prevalence is observed among those with higher education at 3.6%. In addition to the education level, basic writing and communication skills are relevant in determining family sizes. The results indicate that large family sizes are seen among women in rural areas who have the ability to read a whole sentence, a percentage of 63.5% while the least family sizes are among those Blind/visually impaired and No card with required language, a percentage of 0.3% and 0.7% are respectively. Kenya largest economic activity is agricultural production. Majority of women in rural areas are the cultivators of this activity and this is where they find their wealth. The relationship between the wealth index and number of living children shows reveals 23.4% poorest, 23% poorer, 24.2% Middle, 22.3% Richer and 7.1% Richest. Reflecting on the results does not indicate high disparities among the groups though the wealthiest groups of women have the largest family sizes.

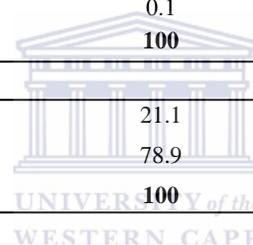
Our findings after a cross tabulation test, state that 68.5% Protestant/ other Christian women had the highest number of living children. We observe an insignificant statistical result P – value of .030 and χ^2 of 77.477. When complying with previous researches view on this and the situation of Kenya, we conclude that the inhabitants in this country are largely Christians. The distribution of land within households in rural areas is between the males and even when there are no males in the family and majority are females.

Findings gathered from this test disclose that 78.9% own land useable for agricultural production while 21.1% do not own land. More results to disclose are 86.5% household owns structure while 82.8% household owns land under structure. Finally a perceptive of employment status and the form of payment was analyzed. The findings disclose that 68.9% are currently employed in different sectors while 31.1% not employed. From those who are employed, the form of payment will differ depending on the nature of work and employer. Our results disclose to us that 29.3% not paid, 55.2% cash only, 13.9% cash and kind and lastly 1.6% In kind only. Interpretation of this results show that majority of employed women are paid in form of cash.

Table 4.5: Associations between Socio-economic variables and number of living children in a household

Variable	No	%	χ^2	P value
Highest educational level			338.937	0.000
No education, preschool	605	12.8		
Primary	3064	64.7		
Secondary	898	19		
Higher	169	3.6		
Total	4736	100		
Wealth index			280.221	0.000
jPoorest	1107	23.4		
Poorer	1090	23		
Middle	1148	24.2		
Richer	1056	22.3		
Richest	338	7.1		
Total	4739	100		
Literacy			400.541	0.000
Cannot read at all	962	20.3		
Able to read only parts of sentence	720	15.2		
Able to read whole sentence	3005	63.5		
No card with required language	32	0.7		
Blind/visually impaired	13	0.3		
Total	4732	100		
Type of earnings for work			126.138	0.000
Not paid	955	29.3		
Cash only	1801	55.2		
Cash and kind	455	13.9		

In kind only	52	1.6		
Total	3263	100		
Respondent's occupation			287.913	0.000
Not currently working	1470	31.1		
Working	3259	68.9		
Total	4729	100		
Religion			77.477	0.030
Roman Catholic	1054	22.2		
Protestant/ other Christian	3249	68.5		
Muslim	269	5.7		
No religion	162	3.4		
Other	6	0.1		
Total	4740	100		
Own land usable for agriculture			33.77	0.002
No	999	21.1		
Yes	3737	78.9		
Total	4736	100		
Household owns structure			215.98	0.000
Owns	4097	86.5		
Pays rent /lease	399	8.4		
No rent/ consent of owner	201	4.2		
No rent/ squatting	37	0.8		
Total	4734	100		
Household owns land under structure			186.431	0.000
Owns	3921	82.8		
Pays rent /lease	332	7.0		
No rent/ consent of owner	405	8.6		
No rent/ squatting	77	1.6		
Total	4735	100		

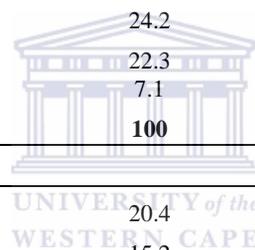


Of recent, education has become the most valuable asset in our Kenyan society. The decision that a society makes might be a result of what they have learnt. The reproductive patterns of a woman is no exception as observed in our findings, highly educated women with ideal number of children is 3.6% while those with primary education are 64.7%. Another variable of analysis is the association between the wealth Index and ideal number of children. The thoughtful reproductive pattern of a woman is mainly accorded by her provision to her family. Ability to support all participants in a household determines the decision of a decent family size. From the findings, a significant statistical result P – value of .000 and χ^2 of 555.734 is formulated. Singling out the results, the lowest decent family sizes are among the richest women represented at 7.1%. In addition, findings on literacy level report that 20.4% cannot read at all, 15.2% able to read only parts of sentence, 63.5% able to read whole sentence, 0.7%, No card with required language, 0.3%, Blind/visually impaired.

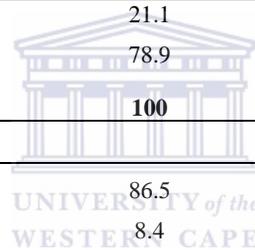
The patterns of land acquisition between rural and urban does not necessary differ but the sole owners of these pieces of land are a question that is still under debate in many rural communities. Urban areas are not gender biased when it comes to owning land unlike rural areas. An analysis focused on rural women but factored in landholdings of households. The results for the association between landholdings and decent family sizes show that 78.9% own land useable for agriculture while 21.1% don't. Furthermore, findings of household owning structure disclose that 86.5 %Own, 8.4% pays rent /lease, 4.3% No rent/ consent of owner, 0.8% No rent/ squatting. From the findings, a significant statistical result P – value of .000 and χ^2 of 72.414 is formulated.

Table 4.6: Associations between Socio-economic variables and Ideal number of children in a household

Variable	No	%	χ^2	P value
Highest educational level			977.455	0.000
No education, preschool	606	12.8		
Primary	3062	64.7		
Secondary	898	19		
Higher	169	3.6		
Total	4735	100		
Wealth index			559.734	0.000
Poorest	1107	23.4		
Poorer	1088	23		
Middle	1147	24.2		
Richer	1057	22.3		
Richest	337	7.1		
Total	4736	100		
Literacy			821.136	0.000
Cannot read at all	963	20.4		
Able to read only parts of sentence	718	15.2		
Able to read whole sentence	3005	63.5		
No card with required language	31	0.7		
Blind/visually impaired	14	0.3		
Total	4731	100		
Type of earnings for work			52.626	0.000
Not paid	953	29.2		
Cash only	1801	55.2		
Cash and kind	456	14		
In kind only	52	1.6		
Total	3262	100		
Respondent's occupation			163.523	0.000



Not currently working	1469	31.1		
Working	3253	68.9		
Total	4722	100		
Religion			812.824	0.000
Roman Catholic	1053	22.2		
Protestant/ other Christian	3247	68.6		
Muslim	269	5.7		
No religion	161	3.4		
Other	5	0.1		
Total	4735	100		
Own land usable for agriculture			94.596	0.000
No	999	21.1		
Yes	3737	78.9		
Total	4736	100		
Household owns structure			72.414	0.000
Owns	4097	86.5		
Pays rent /lease	400	8.4		
No rent/ consent of owner	202	4.3		
No rent/ squatting	36	0.8		
Total	4735	100		
Household owns land under structure				
Owns	3921	82.8	85.256	0.000
Pays rent /lease	332	7.0		
No rent/ consent of owner	406	8.6		
No rent/ squatting	78	1.6		
Total	4737	100		



4.2.2 Associations between Demographic variables and Fertility patterns of women in Kenya

Table 4.7 shows the results of the association between demographic characteristics and children ever born. Most characteristics seem to be statistically significant with the exemption of sex of household head. The reproductive cycle of a woman is dependent on various external factors. An analysis of age group, marital status and sex of household head were run to show their association with children ever born. The 25-29 age groups had the highest 19.5% rate of children ever born. Findings further reveal that age groups 20-24 and 30-34 groups are not far behind with 19.1% and 18.4% respectively. From the findings, a significant statistical result P – value of .000 and χ^2 of 3177.586 is formulated.

In Kenya, marital status is a determining factor of the fertility behaviour of a woman. Traditionally or Biblically a woman's role or command was to go and fill the earth (bear offspring). From table 4.7, it's clearly shown that 77.8% are married cases, 9.1% never married, 6.8% widowed and 6.3% divorced/ not living together. The association of these two variables shows a statistically significant P – values .000 and $\chi^2 = 976.886$. Finally, the demographic characteristic sex of the household is revealed to be statistically insignificant in determining children ever born in a household at P – values 0.247 and $\chi^2 = 16.033$.

Table 4.7: Associations between demographic variables and children ever born in a household

Variable			χ^2	P value
	No	%		
Age group			3177.586	0.000
15-19	211	4.5		
20-24	904	19.1		
25-29	923	19.5		
30-34	872	18.4		
35-39	673	14.2		
40-44	576	12.2		
45-49	573	12.1		
Total	4732	100		
Current marital status			976.886	0.000
Never married	430	9.1		
Married	3676	77.8		
Widowed	323	6.8		
Divorced/ not living together ***	297	6.3		
Total	4726	100		
Sex of head of household			16.033	0.247
Male	3027	63.9		
Female	1712	36.1		
Total	4739	100		

Table 4.8 below shows results of the association between demographic factors and age group .the findings disclose age group 25-29 with the highest number of living children. This is a replica of it been the highest group with children ever born in a household. The association revealed a statically significant result of P – values .000 and $\chi^2 = 2938.965$. The marital status of a woman plays the same role when it is concerned with reproductive activity. A cross tabulation test is performed to show the association of number of living children and marital status. Findings, revealed that 9.1% never married, 77.8% Married, 6.8% Widowed, 6.3% Divorced/ not living together. These results illustrate the traditional perception of communities who believe that marriage is a sanctuary of reproduction. This association shows a significant statistical result P – value of .000 and χ^2 of 855.126. Lastly, the association of the demographic characteristic sex of a household with the number of living children reports that 63.9% are male and 36.1% is females headed households.

Table 4.8: Associations between demographic variables and number of living children in a household

Variable			χ^2	P value
	No	%		
Age group			2938.965	0.000
15-19	211	4.5		
20-24	904	19.1		
25-29	924	19.5		
30-34	872	18.4		
35-39	673	14.2		
40-44	579	12.2		
45-49	575	12.1		
Total	4738	100		
Current marital status			855.126	0.000
Never married	431	9.1		
Married	3678	77.8		
Widowed	322	6.8		
Divorced/ not living together ***	297	6.3		
Total	4728	100		
Sex of head of household			13.484	0.489
Male	3026	63.9		
Female	1710	36.1		
Total	4736	100		

The association of demographic characteristics and ideal number of children show a statistical significant result of P – value of .000 marital status and age group with the exemption of sex of household head. Table 4.9 findings; reveal that age group 25-29 is more concern on strategizing how to have decent family sizes before they begin reproduction/child bearing. Pre-marital sex is gesture condoned by our societies neither do those who engage in it plan to get pregnant in cases where it does. Most married women plan on a decent family size. Findings on our table reveal on this notion to be true with 77.7% of married women planning on the decent family sizes.

Finally the association of sex of household head and ideal number of children in a household shows a statistically significant result P – value of 0.001 and χ^2 of 25.953.

Table 4.9: Associations between Demographic variables and Ideal number of children in a household

Variable	No	%	χ^2	P value
Age group			349.748	0.000
15-19	212	4.5		
20-24	905	19.1		
25-29	922	19.5		
30-34	871	18.4		
35-39	673	14.2		
40-44	578	12.2		
45-49	575	12.1		
Total	4736	100		
Current marital status			276.666	0.000
Never married	431	9.1		
Married	3678	77.7		
Widowed	324	6.8		
Divorced/ not living together ***	300	6.3		
Total	4733	100		
Sex of head of household			25.953	0.001
Male	3026	63.9		
Female	1710	36.1		
Total	4736	100		

2.3 Associations between family planning variables and Fertility patterns of women in Kenya

Table 4.10 presents the results regarding the association of family planning methods and the total number of children ever born to women in rural Kenya. This is a way forward to explain why the reproductive patterns in Africa has not changed even with family planning reforms/initiatives brought in to control the situation. Our findings show that 60.8% do not use contraceptives while 39.2%. This implies that even with awareness, majority eagerly ignore predisposed information. The pattern of use differs in accordance to the intention of the user. Findings show that 18.5% used before last birth and 11.8% used since last birth while others are currently not using and others never did. The association of preferred waiting time the total number of children ever born show a statistical significant result of P – value of 0.001 and. High contraceptive usage cases 26% are reported among women with only one child, 13.8% among those with two.

Table 4.10: Associations between Family planning variables and children ever born in a household

Characteristics	No	%	χ^2	P – value
Currently using contraceptive			607.403	0.000
Yes	1858	39.2		
No	2877	60.8		
Total	4735	100		
Pattern of use			316.627	0.000
Currently using	1858	39.2		
Used since last birth	560	11.8		
Used before last birth	875	18.5		
Never used	1442	30.5		
Total	4735	100		
Children at first use (grpd)			2197.125	0.000
0	306	6.5		
1	1228	26.0		
2	650	13.8		
3	407	8.6		
4+	691	14.6		
5 Never used	1442	30.5		
Total	4724	100		
Unmet need			1381.005	0.000
Unmet need to space	495	10.5		
Unmet need to limit	600	12.7		
Using to space	588	12.4		
Using to limit	1272	26.9		
Desire birth < 2 yrs	707	15.0		
No sex, want to wait	626	13.2		
Infecund, menopausal	441	9.3		
Total	4729	100		
Preferred waiting time (grpd)			136.443	0.001
0 <12 months	306	17.8		
1 year	151	8.8		
2 years	243	14.1		
3 years	267	15.5		
4 years	119	6.9		
5 years	316	18.4		
6+ years	155	9.0		
Non-numeric	109	6.3		
Don't know	52	3.0		
Total	1718	100		

Africa communities affiliate reproduction with wealth. In the regard, the more children you have the wealthier you are alleged. In regard to this notion, our findings reflect this to be true. With a statistically significant result P – value of .000 and χ^2 of 615.296, we observe that 60.8% don't use and 39.2% currently use contraceptives. This is the first indication of failing family planning initiatives with half of the rural women been disinterested in this venture.

The scale of contraceptive usage among living children tends to follow the same sequence as that of total children ever born. Findings in both cases show that contraceptive usage reduces as families get larger. Report on preferred waiting time varies with women. The highest proportions of 18.4% prefer to wait for 5 years while the lowest proportion is 6.9% prefer to wait 4 years.



Table 4.11: Associations between Family planning variables and number of living children in a household

Characteristics	No	%	χ^2	P – value
Currently using contraceptive			615.296	0.000
Yes	1858	39.2		
No	2878	60.8		
Total	4736	100		
Pattern of use			331.170	0.000
Currently using	1858	39.2		
Used since last birth	560	11.8		
Used before last birth	876	18.5		
Never used	1442	30.4		
Total	4736	100		
Children at first use (grpd)			2102.265	0.000
0	308	6.5		
1	1228	26		
2	651	13.8		
3	408	8.6		
4+	691	14.6		
5 Never used	1442	30.5		
Total	4728	100		
Unmet need			1456.988	0.000
Unmet need to space	498	10.5		
Unmet need to limit	600	12.7		
Using to space	587	12.4		
Using to limit	1270	26.8		
Desire birth < 2 yrs	707	14.9		
No sex, want to wait	628	13.3		
Infecund, menopausal	442	9.3		
Total	4732	100		
Preferred waiting time (grpd)			160.305	0.000
0 <12 months	307	17.8		
1 year	150	8.7		
2 years	241	14.0		
3 years	269	15.6		
4 years	118	6.9		
5 years	317	18.4		
6+ years	156	9.1		
Non-numeric	109	6.3		
Don't know	53	3.1		
Total	1720	100		

Results for an association of decent family size and family planning methods are shown in Table 4.12. Findings show that the minority group use contraceptives at 39.2%. A further association of pattern of use and decent family size is significance with P – values .000 and $\chi^2 = 464.397$. The pattern of children at first use indicates the highest proportion of 26% is among those with one child. A higher proportion of 30.5% is found among those who have never used. Moreover associations on unmet need is significant with P – values = .000 and $\chi^2 = 520.545$. Lastly, Preferred waiting time is significance with P – values = .000 and $\chi^2 = 343.767$.



Table 4.12: Associations between Family planning variables and Ideal number of children in a household

Characteristics	No	%	χ^2	P – value
Currently using contraceptive			343.608	0.000
Yes	1858	39.2		
No	2877	60.8		
Total	4735	100		
Pattern of use			464.397	0.000
Currently using	1859	39.2		
Used since last birth	559	11.8		
Used before last birth	876	18.5		
Never used	1443	30.5		
Total	4737	100		
Children at first use (grpd)			890.549	0.000
0	307	6.5		
1	1227	26.0		
2	651	13.8		
3	407	8.6		
4+	689	14.6		
5 Never used	1443	30.5		
Total	4724	100		
Unmet need			520.545	0.000
Unmet need to space	497	10.5		
Unmet need to limit	599	12.7		
Using to space	588	12.4		
Using to limit	1271	26.9		
Desire birth < 2 yrs	707	14.9		
No sex, want to wait	627	13.3		
Infecund, menopausal	442	9.3		
Total	4731	100		
Preferred waiting time (grpd)			343.767	0.000
0 <12 months	307	17.9		
1 year	149	8.7		
2 years	242	14.1		
3 years	267	15.6		
4 years	119	6.9		
5 years	316	18.4		
6+ years	156	9.1		
Non-numeric	107	6.2		
Don't know	54	3.1		
Total	1717	100		

2.4 Associations between literacy, own land usable and the fertility patterns of women in Kenya.

Illiteracy levels in rural Kenya are quite high with majority of these population been females. Most households home school the children and mostly groom them with family education and farming. This is a clear indication of why rural populations are involved in only agricultural production. The association between literacy levels, fertility patterns (CEB) and land holdings is shown below. Findings suggest that high levels of fertility among none land owners is amongst those able to read a whole sentence 52.9% while the same group of literates owning land are amongst the highest reproductive group by 66.4%.

4.13 Associations of literacy, total children ever born and own land usable in a household

Characteristics			χ^2	P – value	
Own land usable for agriculture	No	%			
No	Cannot read at all	294	29.4	148.426	0.000
	Able to read only parts of sentence	151	15.1		
	Able to read whole sentence	528	52.9		
	No card with required language	26	2.6		
	Blind/visually impaired	0	0.0		
	999	100			
Yes	Cannot read at all	668	17.9	470.870	0.000
	Able to read only parts of sentence	566	15.2		
	Able to read whole sentence	2480	66.4		
	No card with required language	6	0.2		
	Blind/visually impaired	13	0.3		
Total	3733	100			

In regard to this association between literacy levels, fertility patterns (living children) and land holdings, our findings show a statistically significant result P – value of .000 and χ^2 of 141.771 among none land owners and χ^2 of 370.352, we observe that 52.6% living children are found amongst those who don't own land and area able to read a sentence and 66.4%39.2% own land and area able to read a sentence.

Table 4.14: Associations of literacy, number of living children and own land usable in a household

Characteristics			χ^2	P – value	
	Own land usable for agriculture	No	%		
No	Cannot read at all	296	29.5	141.771	0.000
	Able to read only parts of sentence	152	15.2		
	Able to read whole sentence	527	52.6		
	No card with required language	27	2.7		
	Blind/visually impaired	0	0		
	Total	1002	100		
Yes	Cannot read at all	669	17.9	370.352	0.000
	Able to read only parts of sentence	567	15.2		
	Able to read whole sentence	2479	66.4		
	No card with required language	5	0.1		
	Blind/visually impaired	13	0.3		
	Total	3733	100		

Table 4.15 shows a similar observation as 4.13 and 4.14 with the highest decent family sizes been amongst those who can read a whole sentence among landowners and those who do not own land. The results show a statistically significant P value of .000.

4. 15 Associations of literacy, Ideal number of children and own land usable in a household

Characteristics			χ^2	P – value	
	Own land usable for agriculture	No	%		
No	Cannot read at all	294	29.4	379.988	0.000
	Able to read only parts of sentence	152	15.2		
	Able to read whole sentence	527	52.7		
	No card with required language	27	2.7		
	Blind/visually impaired	0	0.0		
	Total	1000	100		
Yes	Cannot read at all	669	17.9	431.629	0.000
	Able to read only parts of sentence	566	15.2		
	Able to read whole sentence	2480	66.4		
	No card with required language	5	0.1		
	Blind/visually impaired	14	0.4		
	Total	3734	100		

Our African society is of a patriarchal nature with households constituting of the male as the dominating party (household head) and the females coming in second. In addition,

households that have the largest acres of land space in rural areas are those that are headed by males. This is justifiable by the fact that cultural men are allowed to own land unlike women. Our study showed the association of sex of household and own land useable for agriculture. Findings of the association revealed that the fertility patterns among the households headed by males or females were higher in those who owned land than those who did not own land. It further shows that males who own 80.5% of land and females 78.5%. The model is found to be statistically significant result P – value of .049 and χ^2 of 3.88.

4.16 Associations of Sex of head of household and owning land usable for agriculture in a household

Characteristics		Sex of head of household				χ^2	P – value
		Male		Female			
		No	%	No	%		
Own land usable for agriculture	No	843	19.5	523	21.5	3.88	0.049
	Yes	3482	80.5	1910	78.5		
Total		4325	100	2433	100		

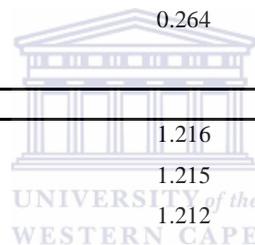
4.3 Logistic Regression

Binary Logistic regression presents findings of the probability of women having small or large family sizes and them owning land or not depending on a set of predictors. The section presents results in form of four models. Model 1 consists of some selected socio-economic, demographic and family planning explanatory variables used in previous test analyses. The dependent variable used in this model is children ever born re-coded into a binary variable as 0(1-4) and 1 (5+). Model II uses similar explanatory variables and the dependent variable living children recorded as 0(0-4) and 1 (5+). Model III has similar explanatory variables and its dichotomous variable decent family size recorded as 0(0-4) and 1 (5+). The last model involves owning land coded as 0 No and 1 yes. The explanatory variables are CEB, living children and decent family size. All variables are of a categorical nature. It's good to note that we consider those with 5 children and more as having large family sizes.

Table 4.17 (Model I) shows the findings of the probability of women having small or large family sizes depending on some selected socio-economic demographic, landholding and family planning variables.

4.17: Binary logistic regression model predicting the odds of children ever born by socio-economic demographic and family planning factors.

Variable	B	S.E.	Sig.	Exp(B)
Education				
No education, preschool	1.457	0.369	0.000	4.292
Primary	1.352	0.311	0.000	3.865
Secondary	0.647	0.317	0.041	1.910
Higher (R)			0.000	
Wealth Index				
Poorest	1.579	0.304	0.000	4.850
Poorer	1.204	0.292	0.000	3.335
Middle	0.841	0.285	0.003	2.319
Richer	0.300	0.264	0.257	1.349
Richest (R)			0.000	
Literacy				
Cannot read at all	-1.064	1.216	0.381	0.345
Able to read only parts of sentence	-1.194	1.215	0.325	0.303
Able to read whole sentence	-1.281	1.212	0.291	0.278
No card with required language	-2.217	1.293	0.087	0.109
Blind/visually impaired(R)			0.049	
Respondents Occupation				
Not working	0.033	0.102	0.746	1.034
Land owned				
No	0.164	0.134	0.221	1.178
Household owns structure				
Owns	1.124	0.700	0.108	3.078
Pays rent /lease	1.268	0.834	0.129	3.553
No rent/ consent of owner	1.059	0.780	0.174	2.883
No rent/ squatting(R)			0.418	
Household owns land under structure				



Owns	-0.283	0.459	0.538	0.754
Pays rent /lease	-0.244	0.661	0.712	0.783
No rent/ consent of owner	-0.384	0.527	0.466	0.681
No rent/ squatting(R)			0.899	
Age group				
15-19	-6.074	0.978	0.000	0.002
20-24	-4.592	0.262	0.000	0.010
25-29	-2.637	0.169	0.000	0.072
30-34	-1.188	0.156	0.000	0.305
35-39	-0.682	0.161	0.000	0.505
40-44	-0.361	0.166	0.030	0.697
45-49(R)			0.000	
Marital Status				
Never married	-0.874	0.340	0.010	0.417
Married	1.198	0.200	0.000	3.313
Widowed	1.107	0.243	0.000	3.026
Divorced/ not living together(R)				
Pattern of Use				
Currently using	1.919	0.167	0.000	6.814
Used since last birth	1.586	0.207	0.000	4.883
Using before last birth	2.460	0.189	0.000	11.700
Never used(R)			0.000	
Children at first use				
0	-2.698	0.255	0.000	0.067
1	-3.171	0.169	0.000	0.042
2	-2.650	0.173	0.000	0.071
3	-1.600	0.179	0.000	0.202
4+			0.000	
Never used(R)				

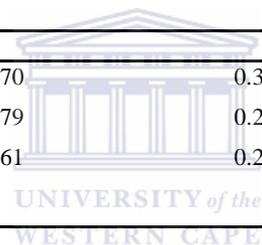
This model is evidence for great predicting capability as the χ^2 value (12.478) was statistically insignificant (0,131), $p > 0.05$. The model as a whole explained between 44.6% Cox and Snell R square and 61.3% Nagelkerke R squared of the variance of children ever born, and correctly classified 84.1% of cases. Findings show that categories of no education and primary education are significant. The odds ratios are 4.292 and 3.865 respectively. This means that uneducated women and primary educated women are 4.292 and 3.865 more likely to have 5 and more children as compared to highly educated women. Wealth index is as well a strong significant indicator, with poorer, poorest and middle class households having an odds ratio of 4.85 3.335 and 2.319 respectively. This trend suggests the height of your wealth index shifts your reproductive capability. Meaning the higher you rise in the income index; it lowers your chances of large family sizes.

Age was statistically significant. Comparing the odds ratio of age 15-19 and 40-44, the two groups are 99.8% and 30.3% less likely to have 5 and more children than age 45-49. The probability of having large family sizes increase with age. The other significant demographic variable in the model is marital status. Singles are 58.3% less likely to have large family sizes as compared to divorcees and separated couples. The married and widowed were 3.3 and 3 times more likely to have large family sizes as compared to divorcees and separated couples. Pattern of use and children at first use are statistically significant. Internally their categories show an increased likelihood of large family sizes. Two important variables respondent's occupation and land ownership were statistically insignificant. In general the model was statistically significant.

4.18: Binary logistic regression models predicting the odds of number of living children by socio-economic demographic and family planning factors.

Variables	B	S.E.	Sig.	Exp(B)
Education				
No education, preschool	1.384	0.369	0.000	3.989
Primary	1.147	0.316	0.000	3.148
Secondary	0.474	0.323	0.142	1.606
Higher (R)			0.000	
Wealth Index				
Poorest	1.435	0.313	0.000	4.199
Poorer	0.973	0.303	0.001	2.645
Middle	0.750	0.297	0.011	2.118
Richer	0.342	0.276	0.216	1.408
Richest (R)			0.000	
Literacy				
Cannot read at all	0.354	0.714	0.620	1.425
Able to read only parts of sentence	0.218	0.715	0.760	1.244
Able to read whole sentence	0.228	0.710	0.749	1.256
No card with required language	-1.142	0.844	0.176	0.319
Blind/visually impaired(R)			0.021	
Respondents Occupation				
Not working	0.109	0.103	0.286	1.116
Land owned				
No	0.131	0.137	0.339	1.140
Household owns structure				
Owns	0.681	0.706	0.335	1.975
Pays rent /lease	0.457	0.891	0.608	1.579
No rent/ consent of owner	0.930	0.792	0.240	2.536
No rent/ squatting(R)			0.593	
Household owns land under structure				

Owns	-0.232	0.479	0.628	0.793
Pays rent /lease	0.224	0.735	0.761	1.251
No rent/ consent of owner	-0.465	0.554	0.401	0.628
No rent/ squatting(R)			0.476	
Age group				
15-19	-21.486	2597.192	0.993	0.000
20-24	-4.776	0.316	0.000	0.008
25-29	-2.781	0.170	0.000	0.062
30-34	-1.239	0.148	0.000	0.290
35-39	-0.653	0.149	0.000	0.521
40-44	-0.434	0.154	0.005	0.648
45-49(R)			0.000	
Marital Status				
Never married	-0.470	0.349	0.178	0.625
Married	1.279	0.209	0.000	3.592
Widowed	0.761	0.246	0.002	2.140
Divorced/ not living together(R)			0.000	
Pattern of Use				
Currently using	1.563	0.149	0.000	4.775
Used since last birth	1.370	0.193	0.000	3.937
Using before last birth	2.197	0.171	0.000	8.995
Never used(R)			0.000	
Children at first use				
0	-2.501	0.267	0.000	0.082
1	-2.726	0.155	0.000	0.065
2	-2.204	0.159	0.000	0.110
3	-1.277	0.160	0.000	0.279
4+			0.000	
Never used(R)				



The model 4.18 containing all predictors was statistically significant indicating that the model was able to distinguish between the categories of the respondent's number of living children in the household. The model reported great predicting capability as the χ^2 value (14.236) was statistically insignificant (0,076), $p > 0.05$. The model as a whole explained between 40.2% Cox and Snell R square and 57% Nagelkerke R squared of the variance in the number of living children, and correctly classified 83.2% of cases. Assessing the socio-economic variables are education and wealth Index showed significant results. In education, the uneducated and primary educated were 4 times and 3 times more likely to have large family sizes as compared to highly educated achievers. Moreover, wealth index of poorer, poorest and middle class households are statistically significant. Poorest households have odds ratio of 4.2. The likelihood of poorer households having more than 4 living children is 2.6 more than richest households. Middle class have an odds ratio of 2. All other socio-economic variables are insignificant.

Age 20-49 are statistically significant, with younger ages have a higher, less likelihood of having more than 4 children as compared to older ages. The variable age-group 15-19 had a high standard error which has an odds ratio which is not consistent and thus ends up affecting the exponential value. The variable was also not significant and thus did not require any interpretation.

Singles shows an odds ratio of 37.5%, as those married are 3.4 more likely to have numerous living children as compared to divorcees and not living together. Family planning variables pattern of use and children at first use are statistically significant. The pattern of use promotes a higher likelihood of having many living children. Children at first use indicate a less likelihood of having numerous living children as compared to those that have never used.

4.19: Binary logistic regression models predicting the odds of decent family size by socio-economic demographic and family planning factors.

Variable	B	S.E.	Sig.	Exp (B)
Education				
No education, preschool	2.767	0.546	0.000	15.916
Primary	1.976	0.524	0.000	7.216
Secondary	1.541	0.529	0.004	4.669
Higher (R)			0.000	
Wealth Index				
Poorest	1.072	0.281	0.000	2.922
Poorer	0.517	0.277	0.062	1.678
Middle	0.595	0.272	0.029	1.814
Richer	0.241	0.251	0.338	1.272
Richest (R)			0.000	
Literacy				
Cannot read at all	-0.197	0.630	0.754	0.821
Able to read only parts of sentence	-0.295	0.630	0.640	0.745
Able to read whole sentence	-0.517	0.627	0.410	0.596
No card with required language	0.199	0.779	0.799	1.220
Blind/visually impaired(R)			0.046	
Respondents Occupation				
Not working	0.173	0.084	0.038	1.189
Land owned				
No	0.261	0.113	0.021	1.299
Household owns structure				
Owns	1.085	0.610	0.075	2.960
Pays rent /lease	1.512	0.714	0.034	4.535
No rent/ consent of owner	1.378	0.670	0.040	3.965
No rent/ squatting(R)			0.184	
Household owns land under structure				



Owns	-0.588	0.398	0.139	0.555
Pays rent /lease	-0.994	0.558	0.074	0.370
No rent/ consent of owner	-0.572	0.447	0.201	0.564
No rent/ squatting(R)			0.295	
Age group				
15-19	-0.865	0.235	0.000	0.421
20-24	-0.626	0.150	0.000	0.535
25-29	-0.610	0.143	0.000	0.543
30-34	-0.420	0.141	0.003	0.657
35-39	-0.068	0.139	0.624	0.934
40-44	0.062	0.144	0.667	1.064
45-49(R)			0.000	0.000
Marital Status				
Never married(R)	-0.203	0.252	0.421	0.816
Married	0.905	0.183	0.000	2.471
Widowed	0.581	0.224	0.009	1.788
Divorced/ not living together			0.000	
Pattern of Use				
Currently using	-0.216	0.122	0.077	0.806
Used since last birth	-0.133	0.158	0.399	0.875
Using before last birth	0.179	0.137	0.191	1.196
Never used(R)			0.000	
Children at first use				
0	-1.117	0.223	0.000	0.327
1	-1.126	0.134	0.000	0.324
2	-0.717	0.140	0.000	0.488
3	-0.509	0.147	0.001	0.601
Never used(R)			0.000	



Model III socio-economic variables education, respondent's occupation and land owned are statistically significant. Results show that the less education leads to the probability of having large family sizes. Uneducated women were 15.9 times more likely to have large family sizes in contrast to highly educated women. The odds ratio of primary and secondary educated was 7.2 and 4.7 in that order. The effect of significance on wealth index was among middle class and poorest households. Poorest households were 3 times more likely to have large family sizes than the richest group. The odds ratio of middle class is 1.8.

This model among the III showed significant results on the respondent's occupation and land ownership. Respondents not working were 1.9 times more likely to have a large family size in contrast to the working group. The effect of land ownership displayed an odds ratio of 1.3; those not owning land were 1.3 times more likely than land owners of having outsized family sizes. As land ownership was statistically significant, the effect of significance of transferred to renters and those with the consent of owner. These groups were more likely to have large households.

Effect on age showed less likelihood among young adults than the older groups. Older groups were found not to be statistically significant. While the effect of marital status was significant overall, the single group showed insignificant results. The odds ratio was highest among the married group. When children at first use are considered, the group with 0 children showed a 67.3% less likelihood of having huge family sizes than non-users of contraceptives.

The model reported great predicting capability as the χ^2 value (9.416) was statistically insignificant (0.308), $p > 0.05$. The model as a whole explained between 19.8% Cox and Snell R square and 28.6% Nagelkerke R squared of the variance decent family size, and correctly classified 77.7% % of cases. The full model containing all predictors was statistically significant.

4.20: Binary logistic regression models predicting the odds of own land useable for agriculture by Fertility.

Variables	B	S.E.	Sig.	Exp(B)
Children Ever Born				
0-4	-0.326	0.170	0.055	0.722
Living children				
0-4	-0.189	0.180	0.292	0.828
Decent family size				
0-4	0.429	0.086	0.000	1.536

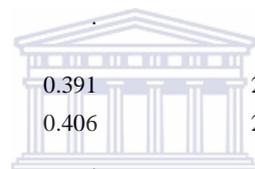
The final model presented by table 4.20 shows findings that assess the impact of a number of factors on the likelihood that respondents would report if they were land owners or not. The model contained three independent variables (CEB, living children and Decent family size). The full model containing all predictors was statistically significant, $\chi^2(4, N = 6616) = 45.2$ $p < .001$ indicating that the model was able to distinguish between respondents who own and don't own land. The model as a whole explained between 1% Cox and Snell R square and 1.6% Nagelkerke R squared of the variance of land ownership, and correctly classified 80% of cases. As shown in the table, only one of the independent variables was statistically significant. The odds ratio from model predicting the likelihood of the different family sizes of land owners showed that children ever born and living children are statistically insignificant. The only significant result from this model is the decent family size. The odds ratio is set at 1.5, meaning households with 0-4 children are 1.5 more likely to have land as compared to households of large family sizes. The model reported great predicting capability as the χ^2 value (3.079) was statistically insignificant $p > 0.05$.

4.4 Multinomial Logistic Regression

This is addition section that presents results of the predictive outcome of the dependent variables children ever born and living children. They categorized in 3 groups, those who have 0-4 children in the first category (rep: 1), while 5-8 children fall in the second category (rep: 2) and 9 above falling in the third category (rep: 3). This analysis helps us to assess the involvement of different characteristics on the likelihood of having large or small family sizes (reproductive behaviour of women). The outcomes are presented in two models of the dependent variables CEB and living children. Model 1 contains the dependent variable CEB. When the variable is cut across the independent variables, it produces some statistical significant and insignificant results.

4.21: Multinomial Logistic regression models predicting the odds of children ever born by socio-economic demographic and family planning factors

Variables	5-8 children			9 and above Children		
	B	Std. Error	Exp(B)	B	Std. Error	Exp(B)
Highest Education level						
No education	0.956	0.225	2.601	1.780	0.388	5.930
Primary	0.799	0.119	2.223	1.505	0.284	4.506
Higher	0.000	.	.	0.000	.	.
Wealth index						
Poor	0.993	0.134	2.699	1.464	0.277	4.321
Middle	0.519	0.136	1.681	1.034	0.282	2.811
Rich	0.000	.	.	0.000	.	.
Literacy						
Cannot read at all	0.841	0.391	2.319	1.464	0.277	4.321
Read only parts/whole sentence	0.697	0.406	2.008	1.034	0.282	2.811
No card _Blind/visually impaired language	0.000	.	.	0.000	.	.
Age-group						
15-19	-5.821	0.977	0.003	-24.523	0.000	0.000
20-24	-4.341	0.256	0.013	-24.471	7308.765	0.000
25-29	-2.383	0.165	0.092	-6.688	1.045	0.001
30-34	-1.024	0.153	0.359	-3.434	0.352	0.032
35-39	-0.587	0.158	0.556	-1.576	0.229	0.207
40-44	-0.405	0.165	0.667	-0.395	0.214	0.674
45-49	0.000	.	.	0.000	.	.
Current marital status						
Single	-0.457	0.313	0.633	-0.457	0.313	0.633
Married	1.171	0.197	3.224	1.171	0.197	3.224
Widowed	1.138	0.241	3.122	1.138	0.241	3.122
Divorced/ not living together	0.000	.	.	0.000	.	.



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Own land						
No	0.164	0.127	1.178	-0.960	0.281	0.383
Yes	0.000	.	.	0.000	.	.
Household owns structure						
Owns	0.221	0.314	1.247	-0.349	0.624	0.705
Pays rent /lease	0.043	0.458	1.044	1.823	1.031	6.189
No rent/ consent of owner /squatting	0.000	.	.	0 ^b	.	.
Household owns land under structure						
Owns	0.086	0.243	1.090	0.324	0.491	1.383
Pays rent /lease	0.229	0.441	1.257	-2.238	1.179	0.107
No rent/ consent of owner /squatting	0.000	.	.	0.000	.	.
Pattern of use						
Currently using	1.925	0.165	6.857	1.475	0.235	4.373
Used since last birth	1.562	0.206	4.766	1.543	0.326	4.679
Used before last birth	2.463	0.186	11.735	2.198	0.269	9.010
Never used	0.000	.	.	0.000	.	.
Children at first use						
0	-2.698	0.251	0.067	-3.593	0.676	0.028
1	-3.126	0.167	0.044	-4.021	0.379	0.018
2	-2.596	0.172	0.075	-3.435	0.388	0.032
3	-1.527	0.177	0.217	-3.025	0.383	0.049
4+	0.000	.	.	0.000	.	.
Never used	0.000	.	.	0.000	.	.
Respondents occupation						
Not Employed	0.007	0.100	1.007	0.056	0.179	1.058
Currently employed	0.000	.	.	0.000	.	.
Current contraceptive use						
Not using	0.000	.	.	0.000	.	.
Using	0.000	.	.	0.000	.	.

a) The reference category is 1.00(0-4 of children ever born)

b) The table represents family sizes of between 5-8 and 9 and more children ever born.

The first part of the model (Table 4.21) presents findings on 5-8 children and a reference category of 0-4 children. Education is statistically significant, uneducated women are 2.6 times more likely to have a family size of 5-8 children than 0-4 compared to highly educated women. Moreover, results show that those with primary education are 2.2 more likely to have 5-8 children than 0-4 compared to highly educated women. The category cannot read at all, literacy variable was statistically significant. This shows that they are 2.3 more likely to have 5-8 children than 0-4 compared to blind/visually impaired women. Wealth Index is statistically significant. The odds ratio of the falling in the poor category is 2.7 more likely to have 5-8 children than 0-4 compared to the rich group. The likelihood decreases as one raises in wealth rank, a illustrative situation is those falling within the middle class having lower likelihood of having children in category 2 as compared to poor class.

The age variable is statistically significant; the older one is the higher the chance of having 5-8 children than 0-4 children. Marital status is another indicator that predicts the likelihood of having children. Married women have a 3.2 probability of having category 2 children than category 1 as compared to divorced women. Contraceptive usage is an outstanding factor that is seen to determine the fertility behaviour of women. Pattern of use is statistically significant. Finally, women using contraceptives after 3 children are 78.3% less likely to have 5-8 children than 0-4 children than those who have never used contraceptives. Probability of falling in the 2 category increases due to the lack of contraceptive usage when a family size is grows larger as seen in table 4.21.

Similar to the results shown for 5-8 children, those with 9 children and more is captured in the table above. Our variable education is statistically significant. The variable literacy was statistically significant. Those who can't read are 4.3 more likely to have a family size of 9 children as compared to blind/visually impaired. As those who can read a sentence or part of it are 2.8 more likely to have a family size of 9 children as compared to blind/visually impaired. The odds ratio for married women was 3.2 indicating that married women are 3.2 more likely to have a family size of 9 children and more than divorced women. Divorced women on the other hand are 3.1 women more likely to have a family size of 9 children and more than divorced/separated women. Of the household variables included in the model, land ownership was the only variable that was statistically significant. Compared to land owners, those without are 61.7% less likely to have more than 9 children than 0-4 children.

Pattern of use is statistically significant with those currently using, used at last birth and used before last birth having an odds ratio of 4.3, 4.7, 9.01 respectively. Another significant variable is that of children at first use. Usage of contraceptives at no children provides a 97.2% less likelihood of having more than 9 children than those who have never used. The women with 1 child are 98.2% less likely to have more than 9 children. It gets harder to have larger family sizes when women practice contraceptive usage after a number of children. All other unmentioned variables were found to be statistically insignificant. The variable age-group 15-19 had a high standard error which has an odds ratio which is not consistent and thus ends up affecting the exponential value. The variable was also not significant and thus did not require any interpretation. The model does not fit, as the likelihood ratio test for the model is significant $p = 0.000$ (the large sample size is part of the explanation). The pseudo-R squared values are: Cox/Snell: 0.487, Nagelkerke: 0.603, McFadden: 0.406.



4.22: Multinomial Logit regression models predicting the odds of living children by socio-economic demographic and family planning factors

Variables	5-8 Children			9 and above Children		
	B	Std. Error	Exp(B)	B	Std. Error	Exp(B)
Highest Education level						
No education	0.977	0.216	2.657	2.116	0.477	8.300
Primary	0.703	0.120	2.020	1.552	0.374	4.719
Higher	-	.	.	-	.	.
Wealth index						
Poor	0.764	0.133	2.147	0.851	0.332	2.342
Middle	0.336	0.136	1.399	0.821	0.336	2.273
Rich	-	.	.	-	.	.
Literacy						
Cannot read at all	1.020	0.357	2.772	2.768	1.248	15.927
Read only parts/whole sentence	0.917	0.370	2.502			
No card _Blind/visually impaired language	-	.	.	2.360	1.253	10.590
Age-group						
15-19	-22.632	5 067.499	-	-23.203	-	-
20-24	-4.567	0.311	0.010	-23.121	-	-
25-29	-2.558	0.165	0.077	-5.974	1.046	0.003
30-34	-1.087	0.144	0.337	-3.651	0.479	0.026
35-39	-0.602	0.145	0.548	-1.705	0.263	0.182
40-44	-0.382	0.151	0.682	-0.697	0.237	0.498
45-49	-	.	.	-	.	.
Current marital status						
Single	-0.061	0.321	0.941	-19.700	-	-
Married	1.273	0.205	3.570	0.502	0.377	1.651
Widowed	0.832	0.242	2.298	-0.364	0.454	0.695
Divorced/ not living together	-	.	.	-	.	.

Own land						
No	0.133	0.128	1.143	-1.345	0.388	0.260
Yes	-	.	.	-	.	.
Household owns structure						
Owns	-0.135	0.315	0.874	-0.616	0.798	0.540
Pays rent /lease	-0.462	0.497	0.630	-20.973	5 656.068	-
No rent/ consent of owner /squatting	-	.	.	-	.	.
Household owns land under structure						
Owns	0.250	0.246	1.283	0.532	0.631	1.702
Pays rent /lease	0.477	0.485	1.612	3.131	2.283	22.904
No rent/ consent of owner /squatting	-	.	.	-	.	.
Pattern of use						
Currently using	1.410	0.143	4.095	0.734	0.252	2.083
Used since last birth	1.216	0.190	3.374	1.239	0.354	3.454
Used before last birth	2.053	0.164	7.793	1.673	0.296	5.327
Never used	-	.	.	-	.	.
Children at first use						
0	-2.350	0.258	0.095	-21.341	7 066.407	-
1	-2.599	0.152	0.074	-3.140	0.451	0.043
2	-2.101	0.157	0.122	-2.753	0.467	0.064
3	-1.101	0.156	0.333	-4.124	0.969	0.016
4+	-	.	.	-	.	.
Never used	-	.	.	-	.	.
Respondents occupation						
Not Employed	0.017	0.100	1.017	0.349	0.206	1.418
Currently employed	-	.	.	-	.	.
Current contraceptive use						
Not using	-	.	.	-	.	.
Using	-	.	.	-	.	.

a) The reference category is 1.00(0-4 living children)

b) The table represents family sizes of between 5-8 and 9 and more living children.

Model 2 presents odds ratios on the likelihood of women having living children from category 2 or 3 in comparison to the reference category one, given a set of independent variables. We assess whether the reproductive behaviour of women has resulted to any changes with the involvement of different characteristics. Results show women with no education and primary educated to be statistical significant. With an odds ratio of 2.7 and 2 respectively, these women are more likely than highly educated women to have 5-8 children as compared to 0-4 children. Illiteracy reveal a statistically significant result. Poor and middle class households are more probably than the rich class households to fall in category 2 than category one. Age group 35-39 are 45.2% less probably of having large family sizes, 20-24 are 99% less likely of having many children, than age 45-49. Females married are 3.6 times than divorced/living children of having 5-8 children compared to 0-4 children. While the effect of pattern of use of significant overall, the probability was highest among those who used before last birth. Overall the variable child at first use is statistically significant.

The variable education is statistically significant, uneducated are 8.3 more likely than highly educated women to have more than 9 children as compared to 0-4 children. The odds ratio of those with primary education is 4.7. Findings of Illiteracy reveal a statistically significant result. Ages 20-44 are less probably of having large family sizes than those in age 45-49. Poor households are less likely to have more than 9 children unlike their middle class households in comparison to the rich class. In all probability they are highly unlikely to have large family sizes with percentages ranging between 99.7% (ages 25-29) and 50.2% (40-44). Those without land are 74% less likely to have large family sizes of more than 9 children as compared to land owners. Pattern of use and children at first use are found to be statistically significant, significant predictors of large family sizes. All other predictors in the model are statistically insignificant. In addition, some of the categories among the variables showed high standard errors which resulted into inconsistent odds ratio values which affect the exponential values. The variables are also not significant and thus did not require any interpretation.

In conclusion, the model does not fit, as the likelihood ratio test for the model is significant $p = 0.000$ (the large sample size is part of the explanation). The pseudo-R squared values are: Cox/Snell: 0.429, Nagelkerke: 0.559, McFadden: 0.384.

CHAPTER 5

DISCUSSION OF MAIN FINDINGS

5.0 Introduction

This section is a discussion of the findings found from a series of tests presented in the {chapter 4} results and findings on cross-tabulation, logistic regression and multinomial logistic regression. This study aimed to show the correlation formed between fertility and landholdings. What is more, it accesses the association of socio-economic, demographic and family planning characteristics in relation to fertility. Furthermore, this section provides answers to the posed research questions and hypothesis structured in the introductory section.

5.1 Fertility and land holdings.

It is important to think of land availability as having two major dimensions important to fertility decisions. First is the size of land-holding to which the family has access for cultivation. Second is the ownership of land, which includes all of the legal and institutional conditions that govern the use of property and the distribution of produce from the land (Schutjer et al. 1983). Men are the sole proprietors, while women are the cultivators of land. In the instance, of death of the husband; their male sons automatically inherit the piece of land, while still maintaining provision for the rights of women to continue cultivating the land.

The trail of childbirth is prominent and thus creates the link between landholdings and fertility prompting in depth discussions. Hence, the premise underlying this study; *What is the relationship between land holdings and fertility among rural women in Kenya?*. In this study, fertility patterns of women is explained by three variables namely children ever born (CEB), living children and decent family size. Findings across all the three variables suggest reveal a positive relationship between size of holdings and fertility. This is characterized by the increase of land leading to increase in fertility. The pattern observed from the findings is of female land owners representing 68.7 percent of those with children while those without

land represent to 30.3 percent. This outcome supports the literature by Schutjer and Stokes (1982) view of land and fertility, whereby the greater the size of land-holdings, the more valuable will be children's labor, thus increasing the demand for children.

Land is a sign of wealth aligned to the male species and a sign of security among the women who had access to it, which results to the birth of many children by the women. It is further shown from the findings that the variables children ever and living children were statistically insignificant. Households with small family sizes of 0 to 4 children are the group of individuals that represent a minimal percentage of land owners. This translates to land owners that are more likely to have larger family sizes than those that do not have land, indicating that those who own any form of land or have accessibility to it, tend to acquire large families. This is a way meant to increase family labour, whether it is within the household's piece of land or rented out space. Literature also points to the fact that high fertility is a woman's way of managing her social and economic position as it ensures continued access to land and labour or children (Frank & McNicoll 1987). This trend follows up with an increase into the income of the whole household. {Using additional family labor profitably}.

Households owning structures and land under structure have larger family sizes as compared to those renting household structures. Of the household variables included in the model, pays rent/lease and no rent/consent of owner were statistically significant. They are 98.4 percent and 87.9 percent less likely to have more than 9 children than 0-4 as compared to those paying no rent/squatting. Stated simply, it is highly unlikely for those without assurance of land to have large family sizes. This is due to the fact that most rural families are dependent on land and without it; they are unable to ensure they cater for the needs of large numbers of children.

5.2 Role played by demographic factors on the fertility patterns of rural women.

The question on every researcher's mind is what role demographic factors such as age, marital status and head of household play in the reproductive patterns of a woman. In this study, fertility patterns of women is explained by three variables namely children ever born (CEB), living children and decent family size. The objective stated concerning this was meant to *"access the impact that demographic factors play on the reproductive behaviour of women"*. Results of the analysis across all the three variables suggest high fertility rates amongst

married women. Marriage ensures a form of security, leading to child birth and larger families from those not in unions. A closer examination when comparing the different categories of marital status of women, we observe that married women are more likely to have more children than singles, widowers or divorcees. Furthermore, they are the group that is supposedly viewed as the one of the largest family sizes of more than 4 children. Marriage is the ideal forum for reproduction, supporting both the African and biblical perception. In the biblical context, God said go and fill the earth while traditionally a married woman is respected when she bears children for her husband. In situations where this does not happen, men marry other women in the hope that they can give them children. Their perceptions are that a woman's place is in the kitchen and all she is meant to do is reproduce.

Age is another determining factor in accessing the fertility patterns of women from rural Kenya. When tested, the relationship between age and fertility patterns of women was significant at $p < 0.05$. This result was similar across all the fertility variables, the older the woman, the more likely she was to have given birth too many children. This corresponds with KDHS 1998 where except for age group 15-19 the rest of the groups showed small systematic increases in ideal family size as the women aged. During the periods of KDHS 1993-1998 noticeable changes in ideal family size were in the older cohorts where the increments in the numbers of children actually born will have been smallest (Kenya Bureau of statistics 2010) are differences that are found in the fertility patterns of women from male headed households compared to those headed by females. In the African setting husbands are the bread winners of families, followed by their wives and then eldest child to the smallest. Households with men as the heads represent 64.6 percent of those with children while homes of females as household's heads represent 35.4 percent. The rule of division amongst all but a small minority of tribal groups of Kenyan households is patriarchal. Upon marriage a woman normally moves to her husband's locality and becomes part of his lineage (Cain 1978).

5.3 Role played by socio-economic factors on the fertility patterns of rural women

In Sub Sahara Africa population growth rates are at three percent per year and prospects for fertility decline are quite remote in many of these countries. It is known from demographic history of the world and from recent and current country experiences that levels of social economic development have powerful influence in fertility change (Singh et al. 1985). Some

of these conditions that influence fertility changes are education attainment (especially women), employment opportunities, and income.

To understand some of the changes, there is a need to create awareness of the influence of socio-economic variables on fertility. The variable education, occupation, wealth index and land holdings were analyzed separately. Fertility patterns of women is explained by three variables namely children ever born (CEB), living children and decent family size. Education is one of the aspects that play a crucial role in fertility differentials of women in rural Kenya. Findings found a statistically significant $p < 0.05$ value, additional we produce a positive relationship in relation to women's education and fertility. At very low levels of education, women give birth to more children than those with higher levels of education. These support the literature that higher levels of schooling are associated to fewer children per woman, in societies where female education enrolment and attainment are higher (Serbessa, n.d). Differentiates can easily be observed amongst primary level achievers and those who have attained anything higher. Further supports from authors such as (Giyato, 2000) have the same perception saying that societies where female education enrolment and attainment is higher, fertility is more likely to be lower. This is because educated women are more likely to be open minded to new ideas and new technologies. A better understanding of why the fertility rate in Kenya has declines and is seen to be widespread is surely an outcome if the increase in educational attainment. Further results in reference to highly educated women show that those who have attained secondary education are 4.7 more likely to have large family sizes while the uneducated women were 15.9 times more likely to have large family sizes. Educated women are in a better position to control their reproductive patterns than their uneducated counterparts.

The results in this study results did not produce results in support of claims from authors such as Bongaarts, (1978) and Singh et al. (1985), who on the contrary to basic belief of education and fertility state that more education may raise fertility as it enables women to follow through on high desired family size (Carr et al. 2006). Caldwell & Caldwell, (2002) also show that female's education is not always associated with fertility reduction. They find that in several African countries where socio-economic indices were higher than that of the first ones, the fertility remained constant, even increased.

An attempt was made to assess the association of fertility behaviour of women and their wealth index. Results revealed that fertility increase is found in the group of women in the richest index category. While corresponding results though {statistically insignificant} show that the poorest households are four times more likely to have a large family size than the richest group of women. These emulates a situation of households with the lowest number of assets having three to four times the number of children unlike those with the highest number of assets. In such cases costs of children are assumed to be relatively low and the benefits high (Carr et al. 2006).

It is claimed that a female's occupation attributable to a reduction in the number of children born in a household. Majority of women in Kenya become engrossed in their occupations and push forward their duties of motherhood. Getting married, coupled with childbearing and childrearing, becomes a constraint for their career. Furthermore, the presence of additional births can hinder parents in competing for the increasing demand for consumer goods and opportunity for female's employment (Hoffman & Hoffman, 1973). The purpose of this analysis was to have a proper understanding of how access and fertility behaviour of women in regards to employment status. We should note that 68.9 percent currently employed (involved in different sectors of the labor market) and 31.1 percent unemployed. Findings reveal differentiates with those currently working having more number of children than those without work. This may be explained that our persons of interest are rural women who are mainly employed in the rural sector and form of employment is from the agricultural sector. They view this type of employment as a secure source of income. In addition, this is an opportunity for the involvement of children in this sector as well and thus makes the cost of children bearable.

What is alarming is the emphasis placed on agricultural production within the rural sector. It is the main economic activity within the area and the only activity that can be taken up by each member of a household. This is a way to ensure returns are managed within the family boundaries. The question asked was "To access the fertility patterns of women with landholdings in rural Kenya?" Most women respondents were land owners, surprisingly their association with fertility was found to be statistical insignificant. Women with smaller families were 1.5 more likely to have land as compared to households of large family sizes. We might point out that the outcome of results may have been different due to the

insignificance. Studies of 1990 show farm sizes that were negatively related to childbearing during the subsequent decade. Women on the smallest farms had more than double the number of births as women on the largest farms. It's essential to note that on average, men's land holdings were almost three times the women's land holdings (Deere and Doss, 2006).

5.4 Role played by family planning factors on the fertility behaviour of rural women.

Family planning initiatives have been implemented in Africa a little bit too late but the fact remains that they have been accepted with a lot of enthusiasm. A specific question was asked "*to assess the impact of family planning characteristics on the reproductive behaviour of women in rural Kenya*"? To access this, firstly we should learn how many use any type of contraceptive and if they have knowledge about the methods. Findings suggest that those who have high fertility behaviours do not use contraceptives while knowledge of various methods was found to be inadequate. Thus, there is still an inadequate understanding of reproductive physiology upon which the success rate of traditional and modern contraceptive methods is assessed. Moreover, there still exists a large gap between knowledge and actual practice of contraception. Studies on contraceptive usage show significant differentials in fertility between societies where contraception is widely practiced and societies who do not use contraception. That more than half of the women not using contraceptives have children. Yet in 1984 contraceptive prevalence stood at from 9.7 percent to 33.7 percent in the 1998 KDHS (Opiyo 2004).

The pattern of use differs, in such situations where current uses have large family sizes. This strategy is evident in conditions which women adopt family planning methods when they have achieved their desired family size. Furthermore these results may be due to an outcome of large family sizes and thus the responding females may be trying to prevent additional birth of children. This observation is similar to that of children at first use, where prevalence of contraceptive usage is found amongst females that have given birth to more than 4. We relate this outcome with a study from Indonesia that has alone reduced its fertility from almost six children per woman in the onset of the initiation of the family planning programme in the 1960s to less than three children per woman (Indonesia, 2008).

Many of the high fertility countries have moderate high levels of unmet need for family planning. Some cases that mention these prevalence is witnessed in areas where International

organizations seem to be ignoring the rapid increasing population and instead of dealing with reproductive health issues are caught up in poverty and HIV issues (May et al., 1990).

5.5 Literacy, landholdings and fertility.

Two hypotheses were formulated to ascertain the impact of literacy and landholdings on the reproductive behaviour of women in Kenya. An analysis was performed by means of cross-tabulation of literacy, landholdings and fertility. The findings suggest that 66.4 percent, who own land and are able to read a whole sentence. More than half of the women who are literate have large family sizes. *Supporting the hypothesis "literate women own large amount of land, give birth to few children"*. Compare these findings with those who do not own land, results show that majority 52 percent that are able to read a sentence have higher family sizes. *Supporting the hypothesis "literate women, who do not own land, have large families."*

This is an indication that it does not matter if whether one has land or not. Both groups of literate women have large family sizes. We can conclude that Illiterate women own large amount of land, give birth to few children as well as literate women, not owning land having large families. The fact remains those women who have a lot of children have big portions of land holdings, to encompass the labour they may want when cultivating land. This women from the rural sector are mostly home schooled by their parents. Studies by Akman (2002), support this as 80 percent female literacy is needed for achieving the replacement level fertility in developing countries. These associations show that ability to read does control the reproductive behaviour.

Nevertheless, authors such as Jeffery and Basu, (1996) report conflicting literature from our findings and argued that in India, "a 10 percent increase in the female literacy rate seems to be associated with a 0.5 decline in total fertility rate". If this were true, in order to reduce fertility, it would be necessary to "arrange for 80 percent female literacy."

5.6 Women headed households and landholdings.

It was hypothesized that majority of Kenyan rural women headed households are landless or have small landholding size. In order to access this hypothesis an analysis was made and results found to be statistical insignificant. Regarding the headship rates and land ownership,

the results revealed male and female headed households that do not differ in landholdings owned {80.5 percent males and 78.5 percent females}. From this, we can rightly say that men and women headed households have an equal distribution in the acres of land that are rightfully owned by them because in the African setting males own land and women are just cultivators in it (Deere and Doss, 2006). Men use their position of dominance to "expropriate" women's rights to land. Women, whose rights to farm a plot of land were guaranteed by marital or kinship status, lose these rights and face a diminished access to land which underlies and reinforces a greater economic and social insecurity (Gray and Kevane, 1999). The nature in which women in a household own this land is highly questionable. Like everywhere else in Africa, the headship rates in rural Kenya are of a patriarchal nature. This is attributed to the fact that upon marriage a woman normally moves to her husband's locality and becomes part of his lineage.

Today the views have changed with women now attaining land through purchase either individually and women groups or as inheritance through their mature sons. These women can only support their claim over the pieces of land that they cultivate if they have the backing of their mature sons. This answers the question "*How does the size of land holdings affect fertility rates of rural women in Kenya?*" In cases that the females have no mature sons, they stand to lose their piece of land to relatives until the children reached of age (Cain, 1978). This indicates that women assume responsibility in the case of a husband's death and ensure a self economic vibrancy on the lands productivity. Another means as advocated by the current Kenyan constitution, is where women now can rightfully inherit both the land of their fathers and husband.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter contains two sections. The first section is an explanation of the outcome of the relationship between fertility and land holdings. It further states the implications of demographic, socio-economic and family planning characteristics on fertility. The second section offers recommendations that provide suggestions for improvement on the reduction of fertility and the way forward to ensure fair distribution of land amongst the sexes.

6.2 Conclusion

This study is used to illustrate if landholdings influence the reproductive behaviour of rural women in Kenya. Furthermore, it outlines the effects of socio-economic, demographic and family planning characteristics on the fertility behaviour of the women residing in rural areas. Our study group is of 6761 females residing in rural Kenya. This group comprises of 2055 never married, 3999 married, 324 divorced/separated and 343 widowed. More than half 59.5%, of our focus group are married.

Kenya's population growth is an overwhelming chapter for its government. Each year the government comes up with strategies on which they can use to curb this expansion. This study tries to communicate one way as to why growth has occurred over the years, by looking at the association of land with fertility.

The growth of Kenya's economy is mainly from the agricultural sector that accommodates most of the labor force in the country. Overall, agricultural production in Kenya is a key player in growth of development in the Kenya. In addition, it is the provider for different communities' as a source of livelihood. Communities have for a long time been involved in agricultural production in which most households are partakes. Households have on the other hand involved its members in this sector as labourers and this way they are able to retain the agricultural proceeds within the family. What strikes us about landholdings is the level of assurance that communities in Kenya derive from them {equating land to revenue and

eventually assurance of security}. These assurance leads to couples, bearing more children as long as they are able to provide for them.

The study findings are derived from cross-tabulation, logistic regression and multivariate test analyses. They produce the following outcomes as summarized below

- ❖ Kenya has an estimated population of 42.7(almost 43 million) as per United Nations, (2012) and a reduced fertility rate of 2.7% per year but yet the growth of the population is still on the increase.
- ❖ The total fertility rate of 8 children per year in the 1970 reduced to 4.5 births per woman during 1990-2000 and navigated to 2.8 births per woman in 2010 (DHS report 2010).
- ❖ Poverty is an escalating issue amongst developing nations that has hindered development and is the number one cause of high fertility across all borders of developing nations. In addition, it is the most challenging Millennium development goal (MDGs) and eradicating it is a priority for all nations that face it.
- ❖ Overall, 79.8% of the households own land useable for agricultural production. Land ownership ensures sense of security for women and thus leads to large family sizes.
- ❖ Agricultural production forms the economic foundation of most of Kenya and employs 75% of those in the labor market. This results show that of the currently employed 68.9% women 25.1% were employees or self-employers in the agricultural sector.
- ❖ The rite of passage of land from parents to children is still prevalent among land owners. Nevertheless, land acres per household have lessened and left families opting for smaller decent family sizes to suit their piece of land.
- ❖ Due to sudden inefficiency of land to distribute from one generation to the next, families from the rural sector are getting smaller. It implies that the surety of security to both parents and children is lacking.
- ❖ The results of the study show that land ownership is significant, when considering ones family size. Meaning land owners are more likely to have large family sizes unlike their counterparts.
- ❖ It is evident that both male and female household heads have equal proportions of land owned. Moreover this equalization has resulted from the sensitization of women

rights over the land .When looking at this outcome from the cultural aspect, widows tend to have mature sons who enable them retain the piece of land after death of husband.

- ❖ Decline of fertility has occurred under the influence of several indicators with the most potential impact advancing from educational attainment. Education amongst our Kenyan communities is supported for the young generation due to lack of landholdings within a family to distribute amongst its members. Moreover, parents' expectation for future financial help is a significant determinant of education enrollment where parents educate children to provide for the social mobility of offspring but also to secure their own economic welfare.
- ❖ The results of the study indicate that the literacy levels of females have no effect on the amount of landholdings a household would own. It as well does not affect the reproductive patterns of women in rural Kenya.
- ❖ Kenya's workforce comprises 25.1% of employees and self-employers from the agricultural sector.
- ❖ Married women in rural areas are more likely to have large family sizes unlike any other marital group.
- ❖ Implementations of family planning services are evident amongst rural women in Kenya, yet the 60.8% of women are not using contraceptives.30.1% use after first birth while 27.5% use after 5 children or more. This is an indicator that in some instances where family planning services are available, they are rendered useless when communities of patriarchal nature. Furthermore, lack of information about this programs to the relevant parties.
- ❖ Age at first marriage in Kenya has risen amongst girls resulting into late child bearing.

The security invested in all the factors in this study is overwhelming; some cause a shift on the negative side {lessen fertility} while others show positivity {increase fertility}. Studies have proven that a family can be as large as wanted if only the parents can provide for them. Scaling of family sizes has occurred due to lack of resources and the increase in the standards of living. Increase in knowledge and family planning services has played a major part in decreasing family sizes.

6.3 Recommendations

The aim of this section is to offer recommendations and insights, based on the findings of the study. The research found that landholdings were equated to the fertility behaviour of a woman. Meaning the greater the amount of land owned by a household, the greater the assurance of security resulting to large family sizes. In addition, significant variations by demographic, socio-economic and family planning patterns have been promoted changes.

These changes have amounted to differences in the economy and environment of Kenya. It has singled out development in most of the centralized areas of the country but has lessened the effect on the rural side of the country. This complicates the whole system of the country and built up a gap between the 2 regions. If this is not worked on, the country's expectations to reach a certain goal may be futile. Some goals are the 2015 MDGs that global organisations set up and address from time to time to help improve the lifestyles /economy of the country.

Based on these findings from the study a few recommendations are made

- ❖ Firstly, throughout the study it is noted that the rural areas are the foundation of patriarchal headship. This translates to women lacking any decision making power (anatomy) when it concerns their reproductive patterns and ability to own land. Recommended facts would be geared to encourage women to become vocal when it concerns their reproductive cycle
- ❖ In addition, set up women organizations that fight for women rights for land ownership. The Kenyan government during the March 2013 general election saw the country elects six posts for each county and one of them was of a woman representative. it is envisioned that this may be one of the effective systems towards fighting for women rights with the inclusion right to land.
- ❖ Secondly, Kenya system of education has improved with the introduction of free pre-school education from the government. Unfortunately the generation at the prime of its reproductive cycle was not a beneficiary to this. This fact raises challenges for the current generation who were not privileged with the current benefits.

Education is a vital component of the development spectrum. key to every successful story. It similarly acts as a replacement for landholdings and a strong indicator of the success of the involvement of other factors. it is through the acquisition of knowledge that families can see the essence of reducing their family sizes and have become less dependent on land. Knowledge is most effective when passed from one generation to the next. Moreover, the measure of treatment for children by an educated parent and that of non educated parent is easily distinguished. One way to ensure that parents educate their children was through the Bill passed by the former president of Kenya, Mr. Mwai Kibaki that coarsed parents to take their children to school or pay a penalty of ksh 10000 (R1000).

- ❖ Consensus when accessing the fertility patterns of a woman involves two parties both males and females, but due to the patriarchal system, females tend to lack a voice concerning this issue. Governments should formulate community organizations to help women voice out their grievances and ensure no harm comes towards them.
- ❖ The government should find ways to encourage people to get involved in the employment sector, acquire knowledge, take up family planning programs, increase their age at marriage etc. These initiatives if improved will larger ensure a positive effect on the rights of women on landholdings and in addition, enable them to make decisions when it concerns their reproductive patterns.
- ❖ Finally, since discussion revolves around women in the rural sector, we are not fully aware of the effects on this study on both women residing in the urban sector and males. To obtaine outcomes and find reasonably ways to improve on the study; both groups need to be involved.

The development of Kenya as a country by instilling some of these recommendations may be equipped to lighten the process. It is still better to conduct further research clearly focuses on gaining a better understanding of this study.

BIBLIOGRAPHY

- Adenekan, S. (2011), Wambui Otieno Mbugua obituary: Spirited campaigner for the rights of women in Kenya. *The Guardian*, Tuesday 18 October 2011.
- Adongo, P.B., Phillips, J.F., Kajihara, B., Fayorsey, C., Debpuur, C. & Binka, F.N. 1997, "Cultural factors constraining the introduction of family planning among the Kassena-Nankana of Northern Ghana", *Social science & medicine*, vol. 45, no. 12, pp. 1789-1804.
- Akmam, W. 2002, "Women's education and fertility rates in developing countries, with special reference to Bangladesh", *Eubios Journal of Asian and International Bioethics*, vol. 12, no. 4, pp. 138-143.
- Andorka, R. 1978, *Determinants of fertility in advanced societies*, Methuen London.
- Barlowe, R. 1972 "Land Resource Economics: The Economics of Real Property". (2nd ed) New Jersey: Prentice Hall Inc
- Barrett, H. Browne, A. 1998, Global Environmental Change Programme Briefs. ESRC Global Environmental Change Programme; 1998 Environmental and Social Change in Zambia: the Value of Children to Rural Households.
- Benoit, F. & Smith, D.P. 1983, "Breastfeeding differential"; Cross National summaries No. 23 London. World fertility survey.
- Blacker, J. 2009, "Kenya's fertility transition: how low will it go?", *asdf*, , pp. 419.
- Bloch, P. 1993. "An Egalitarian Development Project in a Stratified Society: Who Ends up with the Land," in Thomas Bassett and Donald Crummey eds., *Land in African Agrarian Systems*. Wisconsin: University of Wisconsin Press, pp. 222-46.
- Bongaarts, J. & Watkins, S.C. 1996, "Social interactions and contemporary fertility transitions", *Population and Development Review*, , pp. 639-682.
- Bongaarts, J. 1978, "A framework for analyzing the proximate determinants of fertility", *Population and development review*, , pp. 105-132.

- Bongaarts, J. 2003, "Completing the fertility transition in the developing world: The role of educational differences and fertility preferences", *Population Studies*, vol. 57, no. 3, pp. 321-335.
- Brown, E. K.; Asher, R. E. and Simpson, J. M. Y. (2006).*Encyclopedia of language & linguistics, Volume 1, Edition 2*. Elsevier. p. 181. **ISBN 0080442994**.
- Bulatao, A. & Lee, R.D 1983. "An Overview of Fertility Determinants in Developing Countries," New York: Academic Press, pp. 757-787.
- Burns, N. & Grove, S. 2001, "The practice of nursing research: Conduct, critique, and utilization WB Saunders", *Philadelphia, PA*,
- Cain, M. 1985, "On the relationship between landholding and fertility", *Population Studies*, vol. 39, no. 1, pp. 5-15.
- Cain, M.T. 1978, "The household life cycle and economic mobility in rural Bangladesh", *Population and Development Review*, pp. 421-438.
- Caldwell, J.C. & Caldwell, P. 1987, "The cultural context of high fertility in sub-Saharan Africa", *Population and development review*, , pp. 409-437.
- Caldwell, J.C. 2005, "On net intergenerational wealth flows: An update", *Population and development review*, vol. 31, no. 4, pp. 721-740.
- Carr, D.L., Pan, W.K.Y. & Bilsborrow, R.E. 2006, "Declining fertility on the frontier: The Ecuadorian Amazon", *Population & Environment*, vol. 28, no. 1, pp. 17-39.
- Casterline, J.B., Sathar, Z.A. & Haque, M. 2001, "Obstacles to contraceptive use in Pakistan: A study in Punjab", *Studies in family planning*, vol. 32, no. 2, pp. 95-110.
- Central Intelligence Agency 2009, "Kenya" .The World Factbook. Available from <https://www.cia.gov/library/publications/the-world-factbook/> (Accessed 20th January 2011).
- Cheater, A. 1990. "The Ideology of 'Communal' Land Tenure in Zimbabwe: Mythogenesis Enacted?" *Africa*. Vol. 60, no. 2 pp.188-204.

- Clay, D.C. & Johnson, N.E. 1992, "Size of farm or size of family: which comes first?", *Population Studies*, vol. 46, no. 3, pp. 491-505.
- Clay, D.C. & Reardon, T. 1998, "Population and sustainability: understanding population, environment, and development linkages", *Sustainability in Agricultural and Rural Development*, , pp. 117-135.
- Cleland, J. & Jejeebhoy, S. 1996, "Maternal schooling and fertility: evidence from censuses and surveys", *Girls 'Schooling, Women's Autonomy and Fertility Change in South Asia*, Sage Publications, Dehli, forthcoming.
- Cleland, J. 1993, "Equity, security and fertility: a reaction to Thomas", *Population Studies*, vol. 47, no. 2, pp. 345-352.
- De Janvry, A. 1976, "The political economy of rural development in Latin America: an interpretation: reply", *American Journal of Agricultural Economics*, vol. 58, no. 3, pp. 590-591.
- de Sherbinin, A., VanWey, L.K., McSweeney, K., Aggarwal, R., Barbieri, A., Henry, S., Hunter, L.M., Twine, W. & Walker, R. 2008, "Rural household demographics, livelihoods and the environment", *Global Environmental Change*, vol. 18, no. 1, pp. 38-53.
- Deere, C.D. & Doss, C.R. 2006, *Gender and the distribution of wealth in developing countries*, Research Paper, UNU-WIDER, United Nations University (UNU).
- Dei, G. 1994. "The Women of a Ghanian Village: A Study of Social Change." *African Studies Review* 37/2: 121-46.
- Dia, L.O. 2009. "Differentials in Fertility Levels between Gorontalo and West Sulawesi: A Socio-economic analysis". School of Geography, Population and Environmental Management. The Flinders University, Adelaide.
- Dow Jr, T.E., Archer, L., Khasiani, S. & Kekovole, J. 1994, "Wealth flow and fertility decline in rural Kenya, 1981-92", *Population and Development Review*, , pp. 343-364.

- Dribe, M. 2009, "Demand and supply factors in the fertility transition: a county-level analysis of age-specific marital fertility in Sweden, 1880–1930", *European Review of Economic History*, vol. 13, no. 1, pp. 65-94.
- Easterlin, R.A. 1976, "Factors in the decline of farm family fertility in the United States: Some preliminary research results", *The Journal of American History*, vol. 63, no. 3, pp. 600-614.
- Ehrlich, I. & Lui, F. 1997, "The problem of population and growth: a review of the literature from Malthus to contemporary models of endogenous population and endogenous growth", *Journal of Economic Dynamics and Control*, vol. 21, no. 1, pp. 205-242.
- Ellis, F. & Allison, E. 2004, "Livelihood diversification and natural resource access", *Overseas Development Group, University of East Anglia*, .
- Faroutan, Y. 2008, "Women's employment, religion and multiculturalism: Socio-demographic emphasis", *Journal of Population Research*, vol. 25, no. 1, pp. 63-90.
- Filmer, D. & Pritchett, L.H. 2002, "Environmental degradation and the demand for children: searching for the vicious circle in Pakistan", *Environment and Development Economics*, vol. 7, no. 1, pp. 123-146.
- Forster, C., Tucker, G.S.L. & Bridge, H. 1972, *Economic Opportunity and White American Fertility Ratios, 1800-1860*, Yale University Press New Haven.
- Frank, O. & McNicoll, G. 1987, "An interpretation of fertility and population policy in Kenya", *Population and Development Review*, , pp. 209-243.
- Frost, M. 2010, "Landholding and the Demand for Children in Rural Nepal". [Online] Available from <http://paa2010.princeton.edu/abstracts/100560> (Accessed 20th November 2012)
- Galor, O., Moav, O. & Vollrath, D. 2009, "Inequality in landownership, the emergence of human-capital promoting institutions, and the great divergence", *The Review of Economic Studies*, vol. 76, no. 1, pp. 143-179.

- Giyato 2000, *Women's status and fertility in East Java*. Thesis for master degree of population and human resources, Flinders University, Adelaide
- Gray, L. & Kevane, M. 1999, "Diminished access, diverted exclusion: Women and land tenure in sub-Saharan Africa", *African Studies Review*, , pp. 15-39.
- Guyer, J. 1986, "Beti Widow Inheritance and Marriage Law: A Social History", *Widows in African Societies: Choices and Constraints*, , pp. 193.
- Hawley, A.H. 1955, "Rural fertility in central Luzon", *American Sociological Review*, vol. 20, no. 1, pp. 21-27.
- Hoffman, L.W. & Hoffman, M.L. 1973, *The value of children to parents*, Department of Population Planning School of Public Health, University of Michigan.
- Hosmer, D.W. & Lemeshow, S. 2004, *Applied logistic regression*, Wiley-Interscience.
- Hull, T.H. 1987, "Fertility decline in Indonesia: an institutionalist interpretation", *International Family Planning Perspectives*, vol. 13, no. 3, pp. 90-95.
- Indonesia, S. 2008, "and Macro International: Indonesia demographic and health survey 2007", *Calverton, Maryland: BPS and Macro International*, .
- Jacobs, S. 1991, "Land resettlement and gender in Zimbabwe: Some findings", *Journal of Modern African Studies*, vol. 29, no. 3, pp. 523-530.
- Jeffery, R. & Basu, A.M. 1996, *Girls' Schooling, Women's Autonomy and Fertility Change in South Asia*. ERIC.
- Joppe, M. 2000, *The Research Process*. Available from <http://freepdfdb.com/pdf/the-research-process-joppe> (Accessed 25th February 2012).
- Kenya Bureau of Statistics 2010, *Kenya Demographic and Health Survey 2008-09*, Kenya National Bureau of Statistics.
- Kirk, J., & Miller, M. L. (1986). *Reliability and validity in qualitative research*. Beverly Hills: Sage Publications.

- Kleinman, D.S. 1973, "Fertility variation and resources in rural India (1961)", *Economic Development and Cultural Change*, vol. 21, no. 4, pp. 679-696.
- Lee, R.D. & Kramer, K.L. 2002, "Children's economic roles in the Maya family life cycle: Cain, Caldwell, and Chayanov revisited", *Population and Development Review*, vol. 28, no. 3, pp. 475-499.
- Leibenstein, H. 1974, "An interpretation of the economic theory of fertility: Promising path or blind alley?", *Journal of Economic Literature*, vol. 12, no. 2, pp. 457-479.
- Lesthaege, R., Shah, I. & Page, H. 1981, "Compensating changes in intermediate fertility variables and the onset of marital fertility transition", *Proceedings of the IUSSP World Conference in Manila, Philippines*.
- Levy, V. 1985, "Cropping pattern, mechanization, child labor, and fertility patterns in a farming economy: Rural Egypt", *Economic Development and Cultural Change*, vol. 33, no. 4, pp. 777-791.
- Lucas, D. & Meyer, P. 1994, *Beginning population studies*. National Centre for Development Studies, Research School of Pacific Studies, Australian National University.
- Macfarlane, A. 2003. "Resources and Population: A Study of the Gurungs of Nepal". 2nded. Kathmandu: Ratna Pastak Bhandar.
- Makinwa-Adebusoye, P. 1994, "Changes in the costs and benefits of children to their parents", *The Onset of Fertility Transition in Sub-Saharan Africa*, , pp. 175-192.
- Malthus, T.R. & Appleman, P. 1976, "An Essay on The Principles of Population (1798)", *Anthony*,
- Mamdani, M. 1972, "The Myth of Population Control: Family, Class, and Caste in an Indian Village", .
- McCarthy, J. 1982, "Differentials in age at first marriage". *World Fertility Comparative Surveys* 19

- McNicoll, G. & Singarimbun, M. 1983, *Fertility decline in Indonesia: Analysis and interpretation*, National Academies.
- Merrick, T.W. 1978, "Fertility and land availability in rural Brazil", *Demography*, vol. 15, no. 3, pp. 321-336.
- Mueller, E. & Short, K. 1983, "Effects of income and wealth on the demand for children", *Determinants of Fertility in Developing Countries: A Summary of Knowledge*, vol. 1.
- Mwangi, W. & Nyika, D, 2010, "The impacts of poor Governance on Land Development Applications Processes", . Applications Processes, Nairobi, 46thISOCARP Congress. 2010. Available from http://www.isocarp.net/Data/case_studies/1761.pdf (Accessed 16th May, 2012).
- Newbury, M.C. 1984, "Ebutumwa Bw'Emiogo: The Tyranny of Cassava A Women's Tax Revolt in Eastern Zaïre", *Canadian Journal of African Studies/Revue Canadienne des Études Africaines*, vol. 18, no. 1, pp. 35-54.
- Nowak, M.A., Anderson, R.M., McLean, A.R., Wolfs, T., Goudsmit, J. & May, R.M. 1991, "Antigenic diversity thresholds and the development of AIDS", *Science*, vol. 254, no. 5034, pp. 963-969.
- Ogawa, N. 1982, "Differential Fertility in Indonesia and the Philippines: A Multivariate Analysis (< Special Issue> Commemorative Issue on the Retirement of Professor Kazumasa Kobayashi: Population in Southeast Asia", vol. 20, no. 2, pp. 179-205.
- Ogawa, N. 1982, "Differential Fertility in Indonesia and the Philippines: A Multivariate Analysis (< Special Issue> Commemorative Issue on the Retirement of Professor Kazumasa Kobayashi: Population in Southeast Asia", vol. 20, no. 2, pp. 179-205.w
- Ogunlela, Y.I. & Mukhtar, A.A. 2009, "Gender issues in agriculture and rural development in Nigeria: The role of women", *Humanity & social sciences Journal*, vol. 4, no. 1, pp. 19-30.
- Okali, C. 1983, *Cocoa and kinship in Ghana: The matrilineal Akan of Ghana*, International African Institute London, Boston and Melbourne.

- Omondi, G. 2010, "High birth rate dims Kenya's long-term growth prospects" *Business daily*. 27, may, p 1.
- Onyiego, M, 2011, Kenya Red Cross Sees Shift in Attitude Toward Safe Sex. *Voice of America*, 24 March.
- Oparanya .W. A. 2010, 2009 Population & Housing census results. Minister of State for Planning, National Development and Vision 2030
- Opiyo, C. 2004, "Fertility levels, trends and differentials. Central Bureau of Statistics". Available from <http://www.measuredhs.com/pubs/pdf/FR151/04Chapter04.pdf> (Accessed 20th February, 2013).
- Praz, A. 2009, "Religion, masculinity and fertility decline: A comparative analysis of Protestant and Catholic culture (Switzerland 1890–1930)", *The History of the Family*, vol. 14, no. 1, pp. 88-106.
- Price, N. 1996, "The changing value of children among the Kikuyu of Central Province, Kenya", *Africa*, vol. 66, no. 03, pp. 411-436.
- Reid, A. 1993, *Southeast Asia in the early modern era: trade, power, and belief*, Cornell University Press.
- Rosenzweig, M.R. 1977, "The demand for children in farm households", *The Journal of Political Economy*, , pp. 123-146.
- Rough Guides Ltd. (2006). *Kenya and Northern Tanzania* (Map). 1:900,000. The Rough Guide Map. Cartography by World Mapping Project (9th ed.). ISBN 1-84353-359-6.
- Ryder, N.B. 1965, "The cohort as a concept in the study of social change", *American Sociological Review*, , pp. 843-861.
- Saito, K.A., Mekonnen, H. & Spurling, D. 1994, *Raising the productivity of women farmers in Sub-Saharan Africa*, World Bank Publications.
- Schroeder, R.A. 1993, "Shady practice: Gender and the political ecology of resource stabilization in Gambian garden/orchards", *Economic Geography*, , pp. 349-365.

- Schultz, T.P. 1985, "Changing world prices, women's wages, and the fertility transition: Sweden, 1860-1910", *The Journal of Political Economy*, vol. 93, no. 6, pp. 1126-1154.
- Schultz, T.P. 2005, "Fertility and income", *Yale University Economic Growth Center Discussion Paper*, , no. 925.
- Schutjer, W.A. & Stokes, C.S. 1982, "Agricultural policies and human fertility: Some emerging connections", *Population Research and Policy Review*, vol. 1, no. 3, pp. 225-244.
- Schutjer, W.A., Stokes, C.S. & Poindexter, J.R. 1983, "Farm size, land ownership, and fertility in rural Egypt", *Land Economics*, , pp. 393-403.
- Serbessa, D.D, n.d, "Differential Impact of Women's Educational Level on Fertility in Africa": The Case of Ethiopia: Hiroshima University/CICE
- Shipton, P. & Goheen, M. 1992, "Introduction. Understanding African land-holding: power, wealth, and meaning", *Africa: Journal of the International African Institute*, vol. 62, no. 3, pp. 307-325.
- Singh, S., Casterline, J.B. & Cleland, J.G. 1985, "The proximate determinants of fertility: Sub-national variations", *Population Studies*, vol. 39, no. 1, pp. 113-135.
- SOFA Team & Doss, D. 2011, "The role of women in agriculture". Agricultural Development Economics Division. The Food and Agriculture Organization of the United Nations.
- Soini, E. 2006, "Livelihood, land use and environment interactions in the highlands of East Africa", .
- Sokoni, C.H. 2008, "Commercialisation of smallholder production in Tanzania: implications for sustainable resources management", *The Geographical Journal*, vol. 174, no. 2, pp. 158-161.
- Starkweather, J. & Moske, A.K. 2011, *Multinomial Logistic Regression.*, .

Subedi, P.K., 2006, Anthropology of the Old Age Security Motive and Fertility. *Nepal Population Journal*, vol. 12, no. 11, pp. 69-78.

Sullivan, R., Kramer, K.L. and Lee, RD. 2006, 'Counting women's labor: A Reanalysis of children's net production in Mead Cain's Bangladeshi Village'. Presented at the Annual Meeting of the Population Association of America, Los Angeles, CA

The world fact book, n d, "land use" Available in <https://www.cia.gov/library/publications/the-world-factbook/fields/2097.html> (Accessed 14th November 2012).

Thomas, N. 1991, "Land, fertility, and the population establishment", *Population Studies*, vol. 45, no. 3, pp. 379-397.

T'ien, H.Y. 1959, "A Demographic Aspect of Interstate Variations in American Fertility", 1800-1860. *The Milbank Memorial Fund Quarterly*, Vol. 37, No. 1 pp. 49-59.

UNFPA. 2011, "World Population to Reach 7 Billion on 31 October". Available from. From <http://www.unfpa.org/public/home/news/pid/7597> (Accessed 18th, December 2012).

United Nations 2011, "United Nations press release. World Population to reach 10 billion by 2100 if Fertility in all Countries Converges to Replacement Level". Available from http://esa.un.org/unpd/wpp/otherinformation/press_release_wpp2010.pdf (Accessed 17th September 2012).

United Nations Development Fund for Women n d. "*Securing the Rights and Livelihoods of Rural Women in Africa in the Context of the Food Crisis and Climate Change*". Available from <http://dev.iknowpolitics.org/files/Fact%20sheet%20Rural%20LO%20RES%20na1.pdf> (Accessed 17th September 2012).

United nations secretariat n.d, "Fertility levels and trends in countries with intermediate levels of fertility". Population division. Available from <http://www.un.org/esa/population/publications/completingfertility/RevisedFFP SPOPDIVpaper.PDF> (Accessed 17th January, 2013).

United Nations. 1995, "Women's education and fertility behaviour: Recent evidence from the Demographic and Health Surveys". United Nations; New York:

United Nations. Department of Economic 2001, *World population prospects: the 2000 revision. Comprehensive tables*, United Nations.

Van de Walle, E. & Foster, A. 1990, "Fertility decline in Africa", *World*, .

Vlassoff, M. & Vlassoff, C. 1980, "Old age security and the utility of children in rural India", *Population Studies*, vol. 34, no. 3, pp. 487-499.

Yasuba, Y. 1962, *Birth rates of the white population in the United States, 1800-1860*, Johns Hopkins Press Baltimore.

Yin, S. & Kent, M. 2007, "Kenya: The demographics of a country in turmoil", *Population*, vol. 1501, pp. 37.

Zlotnik, H. 2011, "World Population to reach 10 billion by 2100 if Fertility in all Countries Converges to Replacement Level", *Population Division, UN Department of Economic and Social Affairs United Nations Press Release, New York, USA*, .

RESULTS NOT INCLUDED WITHIN THE STUDY

Table 4.23: Binary logistic regression models predicting the odds of hectares for agricultural land by Fertility.

Variables	B	S.E.	Sig.	Exp(B)
Children Ever Born				
0-4	0.296	0.288	0.303	1.345
Living children				
0-4	-0.238	0.298	0.423	0.788
Decent family size				
0-4	0.012	0.144	0.936	1.012

The average amount of land owned by the respondents is 6.1 hectares. The final model above presents findings that assess the impact of a number of factors on the likelihood that respondents would report if they own 6.1 hectares of land or more. The model contained three independent variables (CEB, living children and decent family size). The full model containing all predictors was statistically insignificant, $\chi^2(3, N = 4585) = 1.3, p < .737$ indicating that the model was unable to distinguish between respondents with a large amount of land and those with less. The model as a whole explained between 0% Cox and Snell R square and 0.1% Nagelkerke R squared of the variance of hectares of agricultural land, and correctly classified 91.5% of cases. As shown in the table, none of the independent variables was statistically significant. The odds ratio from model predicting the likelihood of the different family sizes of land owners showed that the predictors children ever born, decent family size and living children are statistically insignificant.

Table 4.24: Multinomial Logistic regression models predicting the odds of fertility variables by hectares for agricultural land

Variable	5children			9 and more children		
	B	Std. Error	Exp(B)	B	Std. Error	Exp(B)
living children*grp^a						
0.1- 1.0	0.568	0.847	1.764	16.078	0.385	9607821.080
1.1-2.0	0.721	0.857	2.057	17.188	0.410	-
2.1-3.0	0.569	0.860	1.767	15.850	0.554	7649174.335
3.1-4.0	0.288	0.877	1.334	16.197	0.591	-
4.1-5.0	0.804	0.874	2.234	15.314	0.913	4474902.878
5.1-6.0	-0.030	1.002	0.971	14.388	2.367	1772985.445
6.1-10	-0.010	0.874	0.990	15.665	0.632	6354899.801
10.1-43.0	0.004	1.218	1.004	0.001	5108.289	1.001
More than 95	-16.177	3908.470	0.000	-0.473	9968.565	0.623
Unknown	0.658	0.861	1.931	16.510	0.000	-
99.9	0 ^c	.	.	0 ^c	.	.
Chidren Ever Born						
0.1-1.0	1.174	1.014	3.236	0.221	1.317	1.248
1.1-2.0	1.217	1.023	3.379	0.990	1.326	2.690
2.1-3.0	1.221	1.024	3.391	-0.129	1.356	0.879
3.1-4.0	0.990	1.037	2.690	0.363	1.362	1.437
4.1-5.0	1.211	1.038	3.357	-0.267	1.416	0.766
5.1-6.0	0.893	1.120	2.443	-2.038	2.685	0.130
6.1-10	0.659	1.034	1.933	-0.502	1.388	0.605
10.1-43.0	0.446	1.340	1.563	-17.120	6804.668	0.000
More than 95	-16.726	6418.446	0.000	-17.622	0.000	0.000
Unknown	1.261	1.025	3.530	0.171	1.349	1.187
99.9	0 ^c	.	.	0 ^c	.	.

The model (Table 4.24) presents findings of the association of hectares of agricultural land and fertility variables (CEB and Living children). The reference category is of 0-4 children. Throughout the model, we observe owners with hectares 0.1- 1.0 been 1.8 more likely to have 5-8 children than 0-4 children. This greater likelihood of having 5-8 children is evident among those with 5 hectares and below. As we continue observing the model, we notice that a change occurs further down where as hectares within a household increase, the less likely it is for families to have larger families of 5-8 children as compared to a size of 0-4 children. Similarly, results of 9 living children or more shown in the model demonstrate that families

owning less land have a higher likelihood of having more children than the mere 0-4 children. But as land size increase, chances of having a large family size (9 or more children) decrease. The model does not fit, as the likelihood ratio test for the model is significant $p = 0.018$ (the large sample size is part of the explanation). The pseudo-R squared values are: Cox/Snell: 0.021, Nagelkerke: 0.026, McFadden: 0.013.

Results for children ever born with the reference group of 0-4 children were captured in the model. Our variable hectare of land useable for agriculture is statistically insignificant. The variable literacy was statistically significant. Those with 0.1-1.0 hectares were 3.2 more likely to have a family size of 5-8 children as compared to owing 99.9 hectares. This likelihood only reduces as the hectares in land increase where for instance those with 6.1-10 hectares are 1.9 more likely a family size of 5-8 children as compared to owing 99.9 hectares.

Of those with 9 and more children with a reference group of 0-4 children, we observe that those with 0.1-1.0 hectares have a 1.2 more likelihood of having a family size of 9 children as compared to owing 99.9 hectares. The odds ratio for 1.1- 2 hectare owners is 2.7 while that of 2.1-3 hectare owner is 12.1%. This 12.1% indicates that owners of land in this group have a 12.1% less likelihood of having more than 9 children as compared to those with 99.9 hectares. Owners of more than 10 hectares of land are 100% less likely to have 9 or more children as compared to owners of 99.9 hectares. The values of 10-43 hectares of land throughout the model of both fertility variables had a high standard error which has an odds ratio which is not consistent and thus ends up affecting the exponential value. The value is not significant and thus did not require any interpretation. All categories within the variables were found to be statistically insignificant.

The model does not fit, as the likelihood ratio test for the model is significant $p = 0.044$ (the large sample size is part of the explanation). The pseudo-R squared values are: Cox/Snell: 0.019, Nagelkerke: 0.023, McFadden: 0.011.